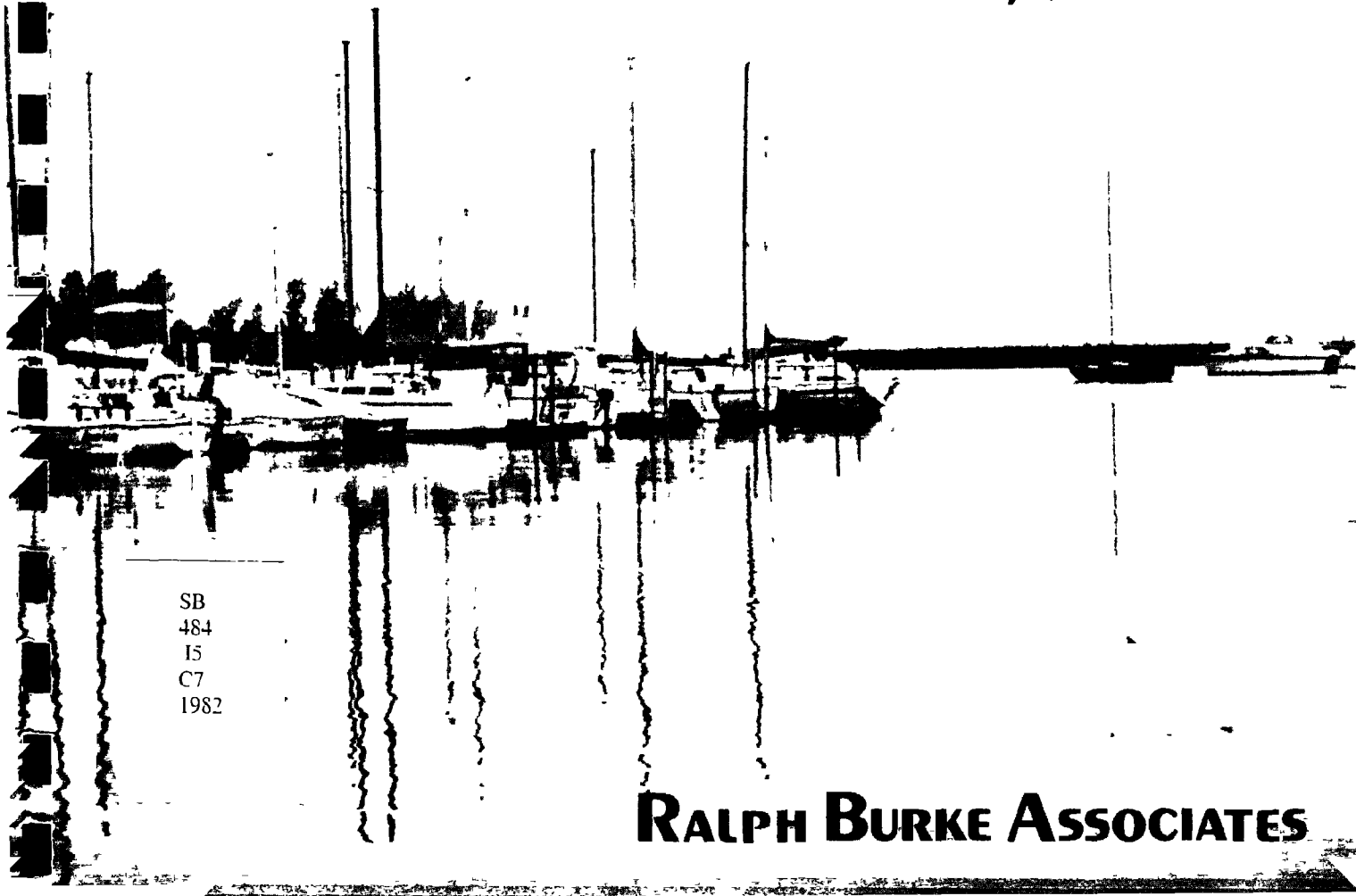


W.P.

# **LAKEFRONT PARK AND MARINA MASTER PLAN STUDY**

**LAKE COUNTY, INDIANA**



SB  
484  
I5  
C7  
1982

**RALPH BURKE ASSOCIATES**

PARK AND MARINA MASTER PLAN STUDY  
LAKE COUNTY, INDIANA

Prepared for the  
Lake County Parks and Recreation Board  
Crown Point, Indiana

Members

Joseph M. Skozen  
President

Frances Dupey  
Moses Dilts

Paul Wharton  
Harold W. Holmes  
William Fifield

Louis M. Casale  
Attorney

Robert J. Nickovich  
Superintendent

Project funded jointly by  
the Indiana Department of Natural Resources  
through a Coastal Energy Impact Program Grant

Maria Rudzinski  
CEIP Coordinator

and the Lake County Parks and Recreation Board

Elaine Chandler  
Project Coordinator

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a comprehensive planning grant provided by the Coastal Zone  
Management Act of 1972, as amended, administered by the  
Office of Coastal Zone Management, National Oceanic and  
Atmospheric Administration.

Prepared By

Ralph Burke Associates  
Park Ridge, Illinois 60068

Project No. 81040

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ENGINEERS  
ARCHITECTS  
PLANNERS

**RALPH BURKE ASSOCIATES**

1550 NORTHWEST HIGHWAY, SUITE 400  
PARK RIDGE, ILLINOIS  
60068  
(312) 297-1172

Ref. #81040

September 23, 1982

Mr. Joseph M. Skozen  
Lake County Parks and Recreation Board  
2293 North Main Street  
Crown Point, Indiana 46307

Dear Mr. Skozen:

We are pleased to transmit herewith the Park and Marina Master Plan Study for the shoreline between the Hammond Filtration Plant and Whihala Beach County Park.

The marina portion of the master plan includes 386 boat slips for in-water boat storage, a new four lane boat launch ramp and parking for 471 automobiles and 119 cars with trailers. A new park is also recommended to connect Whihala Beach County with the new marina. This park would be suitable for picnicking, sightseeing and active recreation such as jogging or bicycling.

The complete marina master plan including the boat launch area is estimated to cost \$10,787,400 in 1982 dollars. The park linkage is estimated to cost \$102,000.

Fees from the harbor and boat launch area will generate enough income to cover the annual operating and maintenance costs and to amortize about \$1,000,000 of the project costs. Other sources of funding would be needed to finance the balance of the construction cost.

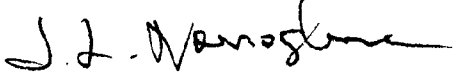
The Corps of Engineers is a potential source of funding for portions of the project and the Lake County Parks and Recreation staff have initiated contact with them to determine the availability of funding for the proposed project.

Mr. Joseph M. Skozen  
Lake County Parks and Recreation Board  
Page Two

We wish to acknowledge again the fine cooperation and assistance received from the Lake County Parks and Recreation Department, especially Mr. Robert Nickovich, Superintendent, and Elaine Chandler, Deputy Director Planning and Development, and Heidi Szrom, Landscape Architect.

Very truly yours,

RALPH BURKE ASSOCIATES  
Engineers - Architects - Planners



J. L. Donoghue  
President

JLD:WVD:c1

Enclosures

## SUMMARY

1. This study has been authorized by the Lake County Parks and Recreation Department to prepare a site selection and a master plan for a park and marina to be located on Lake Michigan in northwest Lake County between the NIPSCO property in Hammond and Whiting City Park in Whiting.
2. There is a demonstrated need for more boating facilities to serve Lake County residents. Jeorse Park in East Chicago has the only publicly available marina facility in Lake County with direct access to Lake Michigan.
3. It is estimated that there is a current need for about 800 boat slips in Lake County. That need is expected to increase to 1080 by the year 2000.
4. A marina with a capacity of 560 to 360 slips would be needed, assuming that other projects now planned are built. A harbor with a capacity of 400 boats has been used in preparing the marina master plan.
5. Seven new launch lanes would be required by the year 2000 at the proposed site. Four launch lanes are provided in the master plan because of constraints limiting the amount of car and trailer parking that could be provided.
6. A storage area should be provided for 30 to 50 sailboats to be stored on land and launched using a boat hoist. About 100 storage spaces should also be available for small sailboats, such as sunfish, in tiered racks at a beach area.
7. Four separate sites in the study area were numerically evaluated as potential park/marina sites using the following criteria:
  - Shore Protection Provided by Existing Facilities
  - Accessibility
  - Impact on Present Recreational Land Use
  - Utilities
  - Land Area for Support Facilities
  - Impact on Natural Features
  - Future Impacts from Industrial Development
  - Impact on Adjacent Land Uses

8. The site located just west of the Hammond Filtration Plant received the highest point total, 485 points of the maximum possible score of 600 points. This location is best suited of the four possible sites for the proposed park/marina.
9. The marina master plan is based upon an analysis and comparison of seven different concepts for the recommended site.
10. The proposed marina Master Plan is composed of two elements: A small boat harbor with inwater boat slips for 386 boats, ranging in size from 26 feet to 40 feet, and a new four lane boat launch facility.
11. A total of 471 automobile parking spaces and 119 car and trailer parking spaces are provided by the Master Plan.
12. The area between the marina and Whihala Beach Park would serve as a connection between these two elements. No through vehicular traffic would be permitted between the marina and Whihala Beach Park. A paved road would link the two areas and would be used by bicyclists, joggers and pedestrians. Vehicular traffic would be limited to emergency and service vehicles.
13. The project cost for the marina and boat launch facility is estimated to be \$10,787,400. The recreation area between the marina and Whihala Beach is estimated to be \$102,000. All costs are in 1982 dollars.
14. It is anticipated that the entire park and marina could be completed in four years after financing has been secured and all necessary governmental approvals and permits obtained.
15. The first year the two breakwaters, the dredging, the bulkhead and the boat ramp would be completed. The first boat slips would also be built the second year. The boat slips would be phased in over a three year period and the parking lot would be expanded to its ultimate size by the fourth year.
16. After the complete Master Plan has been developed, it is estimated that the annual income from rental of boat slips would be \$247,900. Estimated income from other sources including transient slip rental, boat ramp, charter boat fees and sales of gas and oil will be \$81,075 for a combined annual income of \$328,975.
17. The annual operating and maintenance expenses for the project are estimated to be \$139,000 after the Master Plan development is complete.
18. The boat harbor and launch area as proposed in the Master Plan will generate enough income to cover the annual operating and maintenance costs and to amortize a portion of the debt service costs. Based upon the financial analysis, it is estimated that a net annual income of \$189,975 will be available for debt retirement.

19. About \$1,070,000 of the project cost could be amortized from the net income, assuming financing at 12 percent for 10 years with a level annual debt service of \$177 per \$1000 borrowed. Other sources of funding would be required to complete the harbor financing.
20. The Corps of Engineers is a possible source of funding through Section 107 of the River and Harbor Act or by direct congressional authorization. Corps participation would be limited to the breakwaters, navigation lights and dredging.
21. By 1983 the County Lake Parks and Recreation Department will have a potential bonding capability of \$30,000,000. If approved, bonds could be sold to finance that portion of the project cost not financed from other sources.
22. An environmental impact assessment of the proposed project, including the breakwater configuration, will probably be required by the State of Indiana, Department of Natural Resources and the U. S. Army Corps of Engineers before these two agencies can issue permits authorizing construction.

## FOREWORD

While this report was being prepared a \$5,515,000 bond issue was approved for construction projects at several Lake County park sites, including major improvements at Whihala Beach County Park in Whiting. A two lane boat launch ramp, parking for 52 cars with trailers and breakwater are to be built at Whihala Beach. Construction is expected to begin in October, 1982 with the facility available for use in mid-1983. The construction of the boat launch ramp will provide a much needed facility for Lake County boaters.

The park and marina master plan developed for this study would add four additional launch lanes at the marina site, located immediately east of the Hammond Filtration Plant. These two boat launch ramps would be needed to satisfy expected future demand for launching facilities.

Even under the most favorable circumstances, the Whihala Beach boat ramp would be available for a minimum of three to four years before the marina boat launch would be finished and ready for use. These two launch facilities would provide excellent facilities for Lake County boaters. The separation of the two launch areas will minimize possible congestion at a single location. The County would also have the option in the future of using the Whihala Beach ramp as a launch area for non-motorized sailboats only, if there is enough demand and interest for this type of facility.

## 1. INTRODUCTION

In 1975 the Lake County Parks and Recreation Board authorized Ralph Burke Associates to prepare a master plan study for a park and marina complex to be located in Lake County on Lake Michigan. That study was completed in March, 1976. A master plan was prepared for a 600 boat marina and a 21 acre park located in Hammond between the Hammond Filtration Plant on the east and the State Line Generating Plant on the west on property owned by the Northern Indiana Public Service Company (NIPSCO). The plan also included a 25 acre park east of the Hammond Filtration Plant, between the Filtration Plant and Whiting City Park.

Upon completion of the Master Plan Study, the County proceeded immediately to begin implementing the proposed plan by attempting to acquire the NIPSCO property located west of the Hammond Filtration Plant and the property east of the Filtration Plant owned by the C&O Railroad.

In 1977 the County acquired two, four acre parcels between Sheridan Road extended and White Oak Avenue, just west of Whiting City Park. The County is currently in the process of acquiring the remaining 12 acres between the Filtration Plant and Sheridan Road extended. Once acquired the County will have title to about 4600 lineal feet of Lake Michigan shoreline between the Filtration Plant and Whiting City Park.

Efforts to acquire the NIPSCO property have been unsuccessful. NIPSCO has an outstanding fill permit for their property with the State of Indiana. That permit would allow NIPSCO to construct a fill site in Lake Michigan of nearly 400 acres. At the present time NIPSCO is considering using the fill site to construct a new coal-fired generating plant to meet the growing energy requirements for northwest Indiana.

Based upon the inability to acquire the NIPSCO property as a marina site, the Lake County Parks and Recreation Board has authorized Ralph Burke Associates to prepare this site selection and master plan study for a park and marina to be located between the existing NIPSCO property on the west and Whiting City Park on the east. The boating demand for the 1976 report "Lakeshore Park and Marina Master Plan Development" is also to be updated based upon changes in boating ownership that have occurred since the original marina master plan study was published.

## 2. EXISTING CONDITIONS

### A. Property Ownership and Existing Facilities

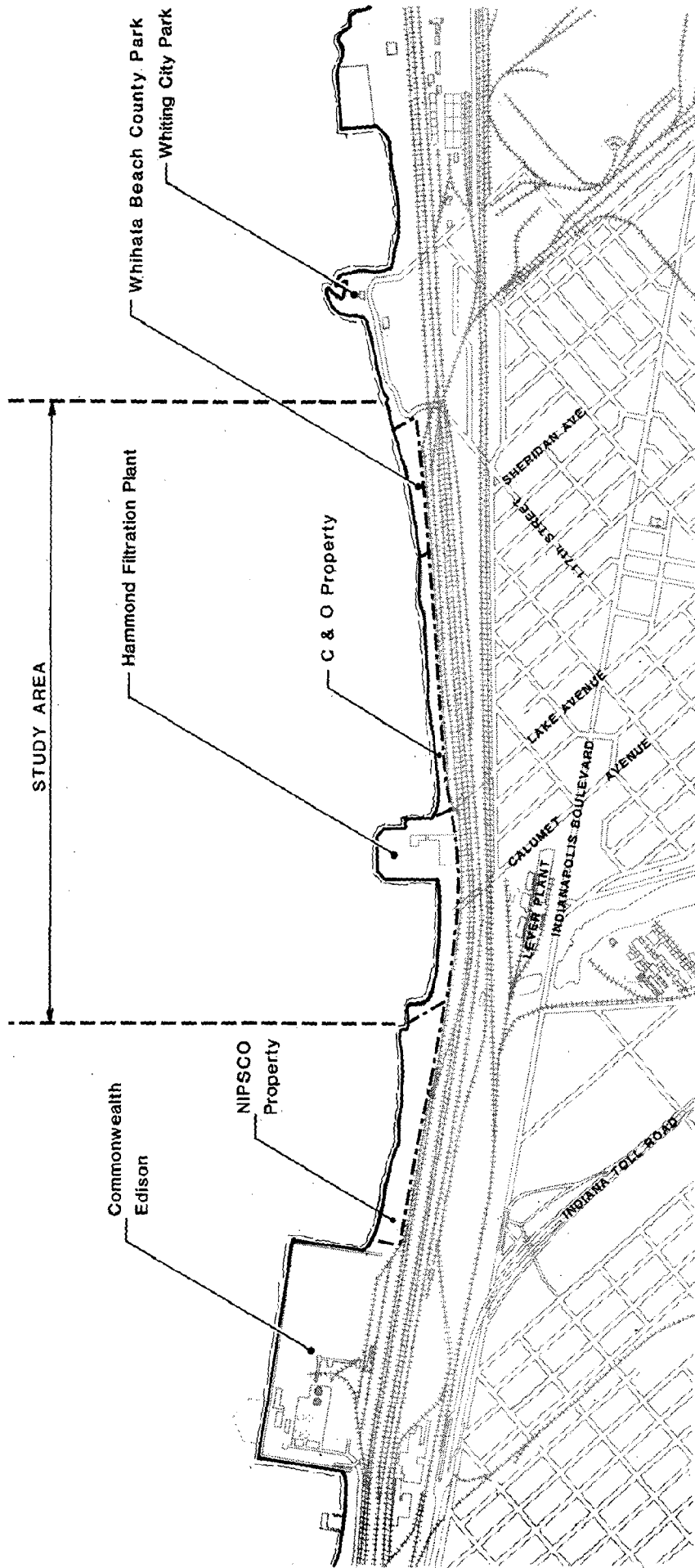
The study area is shown by Figure 1 and consists of the shoreline north of the EJ&E Railroad tracks between the NIPSCO property on the west and Whiting City Park on the east. At this time only one lakefront property in the study area is not publicly owned. The property east of the Hammond Filtration Plant and extending east along the shore some 2000 feet to the centerline of Sheridan Road extended is owned by the C&O Railroad. The Lake County Park and Recreation Board is in the process of acquiring this parcel through litigation. After the property has been acquired by the County, the shoreline in the entire study area will be publicly owned.

The city of Hammond owns the property east of the NIPSCO property. A bathing beach area is located adjacent to the Filtration Plant. A dilapidated concrete boat ramp is located on the beach. Aerial photographs taken in 1978 show a car and trailer on the ramp, either launching or retrieving a boat. However, by 1981 the concrete slab had been broken and disintegrated by storm generated waves so that it is now virtually unusable.

The Hammond Filtration property is located between Calumet and Lake Avenues. The C&O property extends approximately 3000 feet to the east of the Filtration plant to the centerline of Sheridan Road extended. The remaining 1600 feet of shoreline between Sheridan Road extended and White Oak Avenue is owned by the Lake County Parks and Recreation Department and has been named Whihala Beach County Park.

There is a sandy beach area on the west side of the Filtration Plant. However, the beach does not consist entirely of fine sand. There are many pebbles on the beach indicating the scarcity of littoral deposits in this area. Any significant transport of material is blocked by the Calumet Harbor breakwater structure and the extensive fill areas at Inland Steel. West of the existing boat ramp there is only a very narrow strip of land along the water's edge. This remaining shore consists of large stones and pebbles with no usable beach. An existing concrete block bathhouse is located south of the beach. This bathhouse is deteriorated and unusable without extensive rehabilitation.

The shoreline to the east between the Hammond Filtration Plant and the Hammond Sanitary District chlorinator building does not have a sand beach area. The water's edge is unsightly



**FIGURE 1**  
**STUDY AREA FOR**  
**LAKE COUNTY MARINA**



with rubble and broken concrete along most of its length. East of the Hammond Sanitary District Building in Whihala Beach County Park there is a wide beach area. The beach narrows to the east and the composition changes from fine sand to coarser pebble material adjacent to Whiting Park.

In 1981, the Lake County Parks and Recreation Department opened this beach to the public and has provided lifeguards to patrol the beach. Other physical improvements were made that year including a gravel parking area with a capacity for approximately 140 cars and a concession trailer. Usage of Whihala Beach County Park has increased gradually throughout the summer. A maximum of 500 people have been at the beach at one time. Usage of the park is expected to increase as more people became aware of the opportunities available and as the facilities available at the park are improved.

#### B. Future Development

The entire shoreline in the study area will be publicly owned after the Lake County Parks and Recreation Department acquires the C&O property. NIPSCO already owns the property just to the west of the study area. NIPSCO holds an outstanding permit to fill in 390 acres of the lake bottom and is considering the construction of a coal-fired generating plant on the fill area. NIPSCO officials anticipate that the proposed plant would be required in the late 1980's to meet estimated generating needs by that time for northwest Indiana.

At the present time the City of Hammond has no plans for future development of its beach area. The Filtration Plant was enlarged between 1968 and 1971 by filling in an area north of the then existing plant. No additional expansion requiring fill is anticipated. Any expansion of the current facility would take place on the existing fill area in the northwest section of the property.

As part of a larger \$5,515,000 bond issue, the Lake County Parks Department will build some permanent facilities at Whihala Beach County Park. A beach house building with toilets and an outdoor shower will be built near the center of the park. This building will also house a lifeguard/first aid station and a permanent concession area. Beach parking for 110 cars will be provided west of the beach house.

A boat launch facility is to be built east of the beach house. The boat launch facility includes a 300 foot long breakwater, a two lane boat ramp and parking for 52 cars with cars and trailers. The beach house will serve both the beach and the boat launch facility. A gatehouse is to be built at the entrance to the park at White Oak Avenue. This would provide a single control point and allow for the collection of user fees for parking and boat launching.

Whiting City Park is not in the study area, but any developments done in the park might have an effect on park or marina development. A 1980 study of Whiting Park recommended a site development plan for Whiting Park that included an expanded beach area, boardwalk, repair and resurfacing of the park road, improved shore protection and landscaping. These improvements, if implemented, are expected to increase the usage of the park. At the present time, no specific funding for the project, or any portion of it, has been appropriated.

Amtrak is currently constructing a station in Hammond between Calumet and Lake Avenues on property owned by Conrail. The station is located between existing railroad tracks.

The Lever Brothers plant is located south of the railroad tracks along Calumet Avenue. They are in the process of a five year modernization project that has included building a 600 car parking lot south of Indianapolis Boulevard. Access to the Lever Brothers plant from the lot is accomplished using a recently constructed pedestrian bridge over Indianapolis Boulevard. Some plant parking and access also occurs along Calumet Avenue.

#### C. Development Limitations of Existing Shoreline

The width of shoreline will vary from year to year and from season to season as the lake level fluctuates. In the past two or three years the lake level has been relatively high, as much as three feet above low water datum. The widest shoreline area now occurs in Hammond, west of the Filtration Plant, where it is as much as 300 feet wide. The shoreline available in the study reach east of the Filtration plant consists of a narrow strip of land 100 to 150 feet wide between the existing shoreline and the EJ&E Railroad right-of-way. A width of about 120 feet is adequate to provide four rows of 90 degree parking with two double loaded aisles. This amount of parking would be more than adequate to serve a marina extending 400 to 600 feet from the shoreline and could provide approximately one space per slip. The parking requirements for a boat launch facility could also easily be accommodated within the property limits now available. Any other parking or development on the lakefront would require more land area than is now available.

D. Hammond Access Study

In 1980 a study was prepared for the City of Hammond to evaluate access to the site proposed for the park and marina recommended in the 1976 master plan study. The marina and park were to have been located in Hammond between the Hammond Filtration Plant and the Commonwealth Edison bulkhead. The access study consisted of the following areas of concern:

1. Estimate current and projected traffic in the study area.
2. Identify existing and potential future conditions in the study area.
3. Identify and evaluate alternative access corridors to the site.
4. Investigate alternative solutions for providing access along the corridors.
5. Recommend a single access solution including any improvements needed.

Three access routes were considered. Two are on roads that already provide access to the site: Calumet Avenue and Lake Avenue. The third route would have been a new road at 112th Street. Alternative designs were also considered, including a grade crossing, an overpass and an underpass. Cost estimates were prepared for the alternatives and compared using lowest cost as the basis.

The Calumet Avenue route with an improved at-grade rail crossing was the alternative recommended by the study. The Calumet Avenue solution was chosen because it would have the lowest cost, has adequate capacity to carry the projected vehicular traffic and would have the least impact on surrounding traffic and existing land uses.

Calumet Avenue was preferred over the Lake Avenue corridor because it has a wider right-of-way and has commercial/industrial land uses along both sides of the road. Lake Avenue has only two lanes available for traffic and passes through an existing residential area. Some rail related delays are expected using a grade crossing. The access study estimated that between 3 PM to 6 PM on weekdays nine trains will use the tracks, resulting in an average down time of over five minutes per hour. These delay times did not outweigh the higher costs of the other alternatives.

The results of the access study were developed for a marina site west of the Filtration Plant. The results are equally applicable for a marina/park facility located on the east side of the Filtration Plant. However, access from Calumet Avenue would require that the Parks and Recreation Department be permitted to use the existing road located just south of the Filtration Plant. This road is partially on property owned by the City of Hammond and partially on property owned by the EJ&E railroad. At the present time this road is used for access to the Filtration Plant. An existing right-of-way easement permits the Filtration Plant to use of the EJ&E property for access. This road would require widening and a new surface to allow two way traffic to a marina site east of the Filtration Plant. An alternative route would be to use Railroad Avenue south of the tracks between Calumet Avenue and Lake Avenue with Lake Avenue being the primary route into the park.

### 3. DEMAND FOR MARINA FACILITIES

#### A. Population Data

The original 1975 study by Ralph Burke Associates established a market influence area that included Lake and Porter Counties in Indiana and portions of Cook and Will Counties in Illinois. This influence area is also used in this study for the purpose of developing pertinent statistical data and is shown in Appendix A. The 1975 study was based upon statistics developed in the early 1970's. At that time the various planning agencies, the Northwest Indiana Regional Planning Commission (NIRPC) and the Northeastern Illinois Planning Commission (NIPC), had forecast significant population increases for the influence area through the later part of the twentieth century. However, the 1980 census performed by the United States Census Bureau indicated that changes since 1970 have resulted in much diminished growth. In fact, both Lake County, Indiana and Cook County, Illinois had significant decreases in population similar to many northern industrial locations. Therefore, the population projected for the influence area has been reduced accordingly. Between 1980 and the year 2000 the influence area population is expected to increase from 3,037,139 to 3,113,700 as shown by Table 1 and by Figure 2. This is an increase of only 2.5 percent. This compares with an increase of over 13 percent projected during the same period in the earlier study. These results indicate that the population in the marina influence area is projected to remain almost the same through the end of the century unless unforeseen changes in population distribution or in the birth rate take place.

#### B. Estimated Demand for Boating Facilities

##### 1) Existing Boat Ownership

The total registered boats for Lake, Porter and La Porte Counties in Indiana and for Cook and Will Counties in Illinois for the years 1975 to 1980 are shown by Table 2. There are boats registered with the Department of Natural Resources in Indiana and the Department of Conservation in Illinois. The total number of registered boats in the five counties has only increased some four percent from 1975 to 1980. Lake County had only a two percent increase, and there was a three percent reduction in registered boats in La Porte County. In Cook County the number of registered boats increased by 2.5 percent. The number of registered boats in Porter and Will Counties increased by 13 and 15 percent respectively. The increases in these two counties are accompanied by correspondingly large increases in population between 1970 and 1980: 37.5 percent in Porter County and 37 percent in Will County.

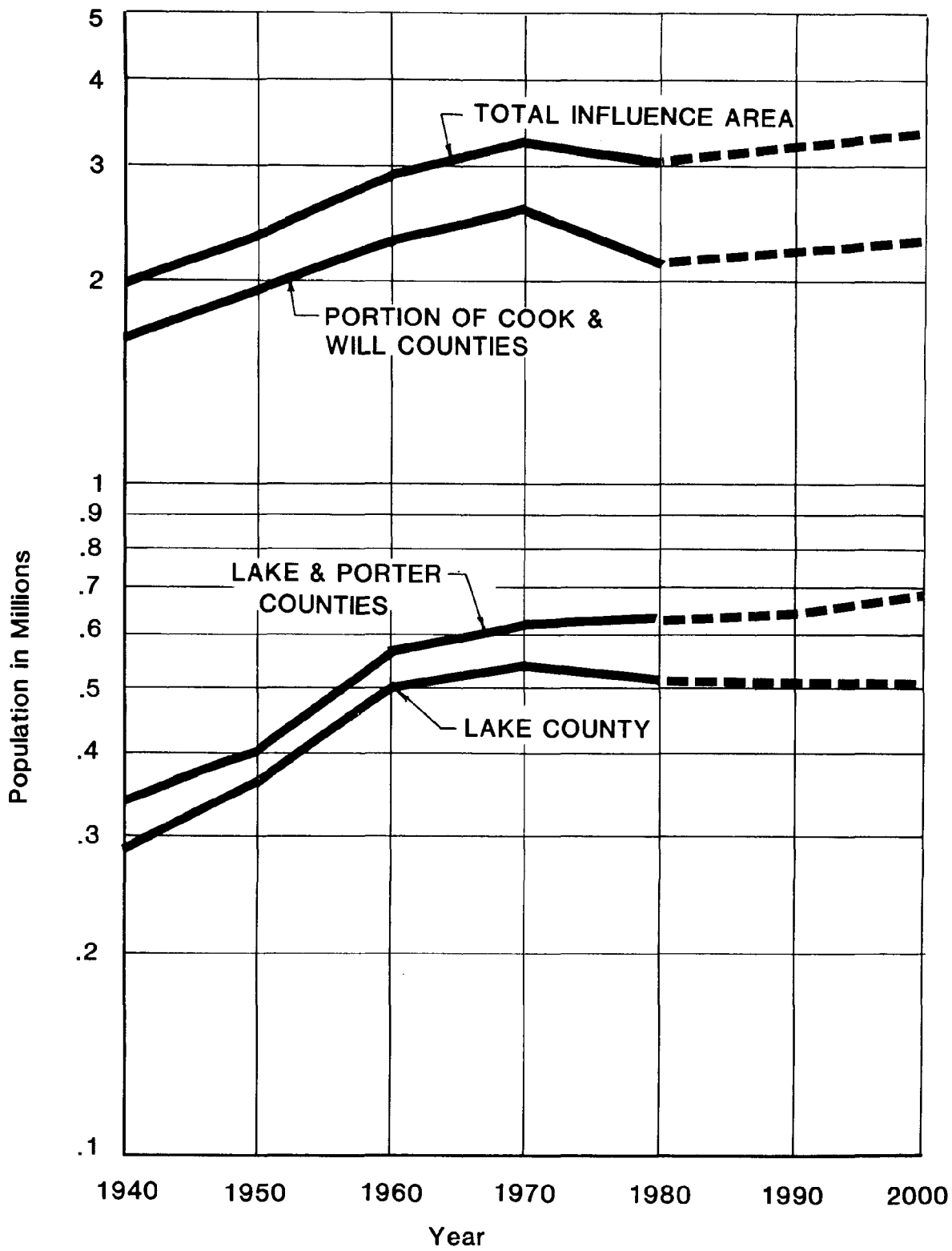
TABLE 1

POPULATION FORECAST  
FOR LAKE COUNTY MARINA INFLUENCE AREA

Location	YEAR						
	1940	1950	1960	1970	1980	1990	2000
Lake County	293,195	368,152	513,269	546,253	522,965	521,000	520,000
Porter County	27,836	40,076	60,279	87,114	119,816	143,800	166,000
Indiana Subtotal	321,031	408,228	573,548	633,367	642,781	664,800	686,000
Cook County*	1,678,221	1,950,452	2,320,309	2,566,917	2,333,200	2,320,000	2,310,000
Will County*	12,349	16,515	28,843	39,538	61,158	92,000	117,700
Illinois Subtotal	1,690,570	1,966,967	2,349,152	2,606,455	2,394,358	2,412,000	2,427,700
	2,011,601	2,373,195	2,922,700	3,239,822	3,037,139	3,076,800	3,113,700

\* Partial

Sources: United States Census of Population 1940, 1950, 1960, 1970, 1980  
Northern Illinois Planning Commission (NIPC)  
Northwest Indiana Regional Planning Commission (NIRPC).



Population Forecast  
for Lake County Marina Influence Area

Legend:  
 — Actual  
 - - Estimated

Figure 2  
 RALPH BURKE ASSOCIATES

TABLE 2

REGISTERED BOATS BY COUNTY 1975-80

	<u>COUNTY</u>					<u>TOTAL</u>
	<u>LAKE</u>	<u>INDIANA</u> <u>PORTER</u>	<u>LA PORTE</u>	<u>COOK</u>	<u>ILLINOIS</u> <u>WILL</u>	
1975	9233	2509	3095	49,756	6,085	70,678
1976	9535	2394	2760	49,583	6,426	70,698
1977	9790	2319	2733	49,993	6,642	71,477
1978	9631	2336	2716	50,515	6,952	72,150
1979	9596	2429	2875	50,480	7,143	72,523
1980	9413	2839	2993	51,000	7,000	73,245

The number of boats documented with the U.S. Coast Guard as of December 31, 1981 are shown by Table 3. These boats are all large boats. A boat must be over 26 feet before it can be registered with the Coast Guard. The percentage change in the number of documented boats for each county is presented in Table 4. The data presented in this table indicates that the number of documented boats increased substantially in Illinois and Michigan. However, a two percent decrease occurred in the Indiana counties. There were two fewer documented boats in Lake County in 1979 than in 1973. Porter County recorded a 19 percent increase. The number of documented boats remained the same in La Porte County, home of the Michigan City Washington Basin Marina.

By contrast, the number of documented boats in Cook County, Illinois increased almost 28 percent, from 1317 in 1973 to 1683 in 1979. During this period, the Chicago Park District has added some 700 to 800 new moorings in their existing harbors. These were added by replacing existing boat moorings with floating docks called "stardocks." Each stardock can accommodate 16 boats, resulting in a more efficient use of a given water area than single moorings. Based upon this data it appears that the increase in documented boats is directly related to an increase in the number of moorings.

A comparison of the number of registered and documented boats per 1,000 population for five counties is presented in Table 5.

TABLE 5

Registered and Documented Boats Per 1,000 Population

<u>County</u>	<u>Population</u>	<u>Boats Per 1,000 Population</u>	
		<u>Registered Boats</u>	<u>Documented Boats</u>
Cook	5,253,190	51,000/5,253 = 9.7	1,683/5,253 = .32
Will	324,460	7,000/324 = 21.6	41/324 = .13
Lake	522,965	9,413/523 = 17.9	59/523 = .11
Porter	119,816	2,839/120 = 23.7	25/120 = .20
La Porte	108,632	2,993/109 = 27.5	32/109 = .29

TABLE 3

U.S. COAST GUARD DOCUMENTED BOATS  
WITH CHICAGO, ILLINOIS AS HOME PORT  
as of December 31, 1979

Listed Location of Owner	BOAT SIZE								Total
	20'-0" To 24'-11"	25'-0" To 29'-11"	30'-0" To 34'-11"	35'-0" To 39'-11"	40'-0" To 44'-11"	45'-0" To 49'-11"	50'-0" To 54'-11"	Over 55'-0"	
Illinois									
N. Cook County*	6	227	373	255	125	44	34	33	1,097
S. Cook County	2	101	212	147	71	24	16	13	586
DuPage County	1	50	77	52	41	9	10	3	243
Kane County	1	7	25	7	6	2	1	2	51
Lake County	0	57	95	62	32	6	3	5	260
Will County	0	8	18	4	6	2	1	2	41
Other Illinois	0	21	34	26	23	6	1	3	114
Illinois Total	10	471	834	553	304	93	66	61	2,392
Indiana									
Lake County	0	8	20	16	10	3	1	1	59
Porter County	0	1	7	12	2	2	1	0	25
LaPorte County	0	4	12	10	3	2	1	0	32
St. Joseph County	1	2	4	3	4	2	2	1	19
Other Indiana	0	5	9	11	7	1	0	1	34
Indiana Total	1	20	52	52	26	10	5	3	169
Michigan Total	0	9	15	20	12	5	5	2	68
Other Locations	1	22	35	35	22	9	4	2	130
Total	12	522	936	660	364	117	80	68	2,759

\* For the purpose of this study, I-90, the Eisenhower Expressway is used as the boundary between North and South Cook County.

TABLE 4

## Percentage Change in Documented Boats

December, 1973 to December 1979

	1973	1979	Percentage Change
N. Cook County*	877	1,097	+25%
S. Cook County	440	586	+33%
DuPage County	142	243	+71%
Kane County	19	51	+168%
Lake County	119	260	+118%
Will County	33	41	+24%
Other Illinois	<u>97</u>	<u>114</u>	<u>+18%</u>
Illinois Total	1,727	2,392	+39%
<u>Indiana</u>			
Lake County	61	59	- 3%
Porter County	21	25	+19%
LaPorte County	32	32	0
St. Joseph County	31	19	-39%
Other Indiana	<u>27</u>	<u>34</u>	<u>+26%</u>
Indiana Total	172	169	- 2%
Michigan Total	52	68	+30%
Other Locations	64	130	+103%
Total	<u>2,015</u>	<u>2,759</u>	<u>37%</u>

These results indicate that Lake County, Indiana has the lowest per capita boat ownership of the three Indiana Counties bordering Lake Michigan. La Porte County has over 50 percent more registered boats per capita and almost three times more documented boats per capita than Lake County. One factor contributing to the relatively high boat ownership in La Porte County is the excellent boating facilities located at the Washington Basin Marina and along Trail Creek.

2) Existing Boating Facilities

The boating facilities from Chicago to Michigan City were inventoried and inspected in June, 1981 to determine what changes, if any, have occurred since the 1975 study. The inventories of the facilities and the rates are indicated by Table 6. As discussed previously, the Chicago Park District has added some 700 to 800 new moorings to their existing harbors since 1975. The situation on the Calumet River and in Lake County, Indiana is unchanged. No new marina facilities have been built in Lake County. Jeorse Park is still the only marina facility in Lake County that has direct access to Lake Michigan.

Several private marina operators on the Burns Waterway have expanded their operations. For instance, Lefty's Coho Landing now has new slips along the east bank of the waterway. The hazardous entrance conditions still exist at the mouth of the waterway. The Portage Port Authority has been established to improve conditions on Burns Waterway. Operating funds are being raised by a tax imposed upon boats stored in slips and upon boat launches. The tax on boats stored in slips is one dollar per foot and a flat fifty cent fee is charged each time a boat is launched. Income from these assessments was approximately \$20,000 in 1980.

The Michigan City marina facilities are located in La Porte County. The Washington Basin Marina has added a new boat launch facility inside the harbor area. A boat ramp has been built for non-motorized sailboats, mostly Hobie Cats, which are twin-hulled catamarans. A privately financed residential condominium development has also been built on Trail Creek just east of the bridge. Each condominium home has a slip on Trail Creek that is sold with the home.

3) Proposed Boating Facilities

Several studies and proposals have been developed for new marina facilities or expansions of existing facilities

TABLE 6  
MARINA FACILITIES AND RATES IN LAKE COUNTY, INDIANA,  
LITTLE CALUMET RIVER, BURNS WATERWAY AND MICHIGAN CITY, SURVEYED JUNE, 1981

MARINA	Number of Slips	Slip Rate	Launch Rate	Winter Storage Rate	Launch Lanes	Available Support Facilities					
						Repair Facilities	Club House	Water	Power	Security Lighting	Control Building
<u>LITTLE CALUMET RIVER</u>											
Croissant Marina	38	\$450 for 25'	\$ 3.00	\$11/Ft.	Hoist	Yes	Yes	Yes	Yes	Minimal	Yes
Dolton Sun Marina	200	\$17/Ft.	75¢/Ft.	Inside \$18/Ft. Outside\$17/Ft.	Hoist	Yes	Yes	Yes	Yes	Yes	No
Gumbo's Marina	60	\$350 for 25'	-	Inside \$20/Ft. Outside\$ 9/Ft.	None	Yes	No	Yes	Yes	Yes	No
Klimeks Boat Yard	104	\$10.25/Ft.	-	\$9/Ft.	None	Yes	No	Yes	Yes	Yes	No
Red Mill Marina	4	\$350	-	\$10/Ft.	None	No	No	No	No	No	No
Skippers Marina	40	\$450 for 25'	\$5.00	Outside \$1.10/ Sq.Ft.	1	Yes	Yes	No	No	No	No
Sunset Marina	20	\$14/Ft.	\$5.00	\$14/Ft.	Hoist	Yes	No	Yes	Yes	No	No
Windjammer Marina	22	\$450 to 30' \$10/Ft. over 30'	\$5.00	\$11/Ft.	1	Yes	No	Yes	Yes	No	Yes
<u>LAKE COUNTY LAKE FRONT</u>											
Jeorse Park	45 Moorings	Resident \$75+\$2/Ft. over 16' Non-Resident \$120+\$2/Ft. over 16'	Resident \$4 or \$25 Season Non-Resident \$6 or \$40/ Season	None	1	No	Yes	No	No	Yes	Yes
<u>BURN'S WATERWAY</u>											
Doynes	60	\$475 up to 24'	\$3.50	\$9.50/Ft.	2	Yes	No	Yes	Yes	No	No
Duvals	N/A	\$20/Ft.	-	\$10/Ft.	None	Yes	No	No	No	No	No
Howard Westerman	60	\$300 to \$325	-	N/A	None	No	No	Yes	Yes	Yes	No
Lefty's Coho	140	\$475 for 22' \$10/Ft. over 22'	\$3.50	\$22/Ft.	2	Yes	No	Yes	Yes	Yes	Yes
Marquette Boat Club (Private)	72	N/A	None	None	None	No	Yes	Yes	Yes	Yes	Yes
Miller Izaak Walton (League (Private))	N/A	N/A	N/A	N/A	N/A						
Salt Creek Landing	8	\$475 up to 24' \$10/Ft. over 24'	-	None	None	No	No	Yes	Yes	No	No
South Shore Marina	44	\$375 plus \$15/Ft. over 20	\$3.75	\$8/Ft.outside \$15/Ft.inside	2	Yes	No	Yes	Yes	Yes	Yes
Treasure Chest	40	\$400	-	None	None	No	No	No	Yes	No	Yes
<u>CALUMET HARBOR</u>											
Calumet Yacht Club (Private)	40	N/A	N/A	Yes	1	No	Yes	Yes	No	No	Yes
<u>MICHIGAN CITY</u>											
Washington Park Marina	412	\$485 for 25' to \$1420 for 50'	Resident \$40r \$40/ season non- resident \$6 or \$60/ season	None	4	No	Yes	Yes	Yes	Yes	Yes
Sprague Marina	70	\$340 for 20' \$390 for 25'	Resident \$2.00 \$30/season Non-res.\$4 \$45/season	\$12 - \$14 per Ft.	2	None	No	No	No	Yes	Yes
Goerg Boats & Motors	42	NA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
B & E Marina	55	25' - \$380	Hoist \$5/Ft.	\$15/Ft.	Hoist	Yes	No	Yes	Yes	Yes	Yes
South Lake Marina	60	\$550 to 23' \$650 to 35'	\$2.50/Ft. for Hoist	\$15/Ft. to \$19/Ft.	Hoist	Yes	No	Yes	Yes	Yes	Yes

within the study area. Master plans have been developed or are being developed, for new marina facilities at Jeorse Park, a marina in Gary sponsored by the U.S. National Park Service through the National Lakeshore, more facilities in the Burns Waterway with accompanying improvements, and several major new facilities at Michigan City.

A 1978 study for East Chicago, Indiana proposed a Lakefront Development Plan that included improved boating facilities. A total of 160 boat slips and a 100 boat drystack storage facility are included in the plan. The 160 slips would provide a net increase of 120 boat slips after subtracting the 40 mooring spaces now provided in the harbor.

The National Park Service is presently conducting studies for a marina facility to be located in Gary. The location being studied is in Marquette Park adjacent to the U. S. Steel bulkhead and fill area and north of the Miller Lagoon area. In 1981 the National Park Service completed a hydrodynamic study of currents and littoral drift in the area of the proposed marina. This work was performed as part of the first phase of a General Management Plan being done for the Indiana Dunes National Lakeshore. At this time the Park Service has prepared a conceptual plan and preliminary cost estimate for the marina. A capacity of 600 boats is being used as the tentative harbor capacity. The study was completed in September, 1982.

As part of its flood control project for the Little Calumet River Basin, the Indiana DNR and the U. S. Army Corps of Engineers have developed a master plan that includes several recreational projects that would be accomplished concurrently with the flood control project. Among the recreation projects that have been considered is a marina on the Burns Waterway. The marina would be located south of the existing private marinas. In a 1975 study prepared for the Indiana Department of Natural Resources, a preliminary development plan was established. This plan included 1200 boat slips and 25 boat launch lanes. The existing private marina facilities would have been eliminated by this plan so that of the 1200 slips proposed, 600 would be replacement, resulting in a net increase of about 600 slips. This plan has subsequently been modified. At this time, the revised plan would add 200 new slips without affecting the existing marina facilities. Facilities would be limited to power boats less than 35 feet long. Improvements are also planned at the mouth of Burns Waterway so that boats could safely enter and leave during periods of rough water. No provision has been made to accommodate sailboats because of

the clearance restrictions imposed by existing railroad and highway bridges located between the mouth of the Waterway and the marina facilities.

The Little Calumet River project is now in the preliminary development phase. The Corps of Engineers is developing a plan for the marina and their report is scheduled to be published in June, 1982. Funding for the harbor protection and some dredging to improve the boating channel has not yet been allocated, either at the national, state or local level. Approximately \$2,700,000 has been appropriated for property acquisition for the flood control portion of the project. The marina development is not included in this amount and private financing may be encouraged for the marina facilities instead of public financing.

A recreational boating plan has been developed for Michigan City in La Porte County as a part of a planning study for the entire north end of Michigan City, including the Indiana Dunes National Lakeshore area to the west. This study was completed in December, 1980 and was financed in part through the Indiana Coastal Zone Management Program. The study has proposed several major development projects both public and private with a total estimated cost of \$94,000,000. Several new marina projects are included in the plan. A new 445 slip public marina is recommended. It would be located north of the existing Washington Basin Marina and would require new breakwaters and fill to provide the necessary protection from wave action and land area for support facilities. About 115 new public slips would also be located at the mouth of Trail Creek adjacent to the U. S. Coast Guard Station. Other opportunities are identified for private development along Trail Creek. Over 500 new slips would be added by these private projects.

All of the projects identified in the previous discussion are in the preliminary or conceptual planning stage of development. These projects require further refinement and analysis before they can be realized. Also, no definite financing or funding has been arranged for any of the proposed marina developments at this time.

#### 4) Estimated Boat Slip Demand

It is conservatively estimated that by the year 2000 the demand in Lake County would be for about 1080 slips in new marina facilities with direct access to Lake Michigan. The present and projected demand are presented in Table 7. These data are derived from the 1975 study by Ralph Burke Associates and have been adjusted to reflect a reduction of the expected population growth within the next 20 years. A complete derivation of the demand data is

TABLE 7

ESTIMATED PRESENT AND PROJECTED DEMAND  
FOR LAKE COUNTY MARINA FACILITIES

<u>LOCATION</u>	<u>1981</u>		<u>1990</u>		<u>2000</u>	
	<u>BERTHS</u>	<u>BOATS USING LAUNCH RAMPS</u>	<u>BERTHS</u>	<u>BOATS USING LAUNCH RAMPS</u>	<u>BERTH</u>	<u>BOATS USING LAUNCH RAMPS</u>
Lake County	500	1094	610	1360	680	1517
Porter County	65	128	79	159	88	177
Cook County	149	191	182	237	200	264
Will County	10	6	12	8	13	10
Other Areas	<u>74</u>	<u>100</u>	<u>90</u>	<u>120</u>	<u>100</u>	<u>130</u>
TOTAL	798	1519	973	1884	1081	2255

presented in Appendix C. These data assume that new facilities are available in Lake Michigan to stimulate demand and that the per capita boat ownership in Lake County increases as a result. As discussed previously Lake County now has the lowest per capita boat ownership of the three Indiana counties with Lake Michigan shoreline which is reflection of the lack of boating facilities in Lake County.

The latest media income data available from the Department of Commerce (1977) indicate that both Lake County and LaPorte County have similar incomes.

Media Family Income (1977)

Lake County	\$6,189
Porter County	\$6,578
LaPorte County	\$6,020

This indicates that the number of registered and documented boats would increase in Lake County if more boating facilities were available.

As discussed previously, only two other marina projects are being actively considered for Lake County. The Gary Marina sponsored by the National Lakeshore and the Jeorse Park expansion. The size of the Gary Marina has not been established, but a capacity of 600 boats is being used for the conceptual plan. For the purposes of this analysis a range of 400 to 600 slips is used. The Jeorse Park facility will add 120 new slips. Subtracting the estimated capacity of these two facilities from the estimated demand of 1080 slips results in an estimated Lake County Marina capacity of 460 to 360 boats as follows:

TABLE 8

Estimated Capacity for Lake County Marina

Demand/Year 2000 (See Table 7)	1080 Slips
Minus Jeorse Park	120 Slips
Minus National Lake Shore Marina at Gary	<u>400 to 600 Slips</u>
Net Capacity	560 to 360 Slips

This analysis does not include a reduction for the proposed facility on the Little Calumet River. Some 200 slips are to be provided on the Little Calumet River. These slips cannot be used by sailboats and would also be much less attractive to boaters than slips with direct access to Lake Michigan. Even if 100 users of the Little Calumet River were subtracted from the total demand, the net size of a Lake County Marina facility would fall between 260 and 460 slips. For the purposes of this report, a capacity of 400 slips is used in preparing the marina master plan.

5) Estimated Demand for Launch Lanes and Other Types of Boating

The results of Appendix C, Table C-5, indicate an existing demand of 11 to 14 launch lanes. Subtracting from these the two existing lanes at Jeorse Park and the two lanes to be built at Whihala Beach Park results in existing

need for seven to ten new lanes. By the year 2000, 11 to 14 new lanes would be required to meet the demand. Assuming one-half the required capacity were built in a single location in Hammond or Whiting and the remainder at Gary, about 4 new lanes are required now, and seven new lanes would be needed by the year 2000.

The number of boat launch lanes actually provided will depend upon the land area available or created for car and trailer parking. For the purposes of this study consideration will be given to providing from two to eight launch lanes depending upon the harbor plan and the area available for parking.

The previous analysis has considered only motorized craft: power boats and sailboats with motors. There is also considerable demand for non-motorized sailboats. These can be categorized in three ways:

- a. Boats with trailers stored on land and launched by hoist or crane.
- b. Boats stored on racks and launched on the beach.
- c. Boats launched from cars with trailers.

Many of the larger non-motorized racing sailboats with fixed keels are stored on trailers and launched each time they are used, using a hoist or gantry crane. They are usually stored in a fenced area and remain at the launch site during the boating season. Smaller boats, such as sunfish, can be stored on racks at a beach. They can easily be launched by one or two people using specially designed two wheeled dollies to transport them between the water and the boat rack. When not in use, the boats are locked in their position on the rack. Sails and other gear are usually stored in lockers located near the racks.

The third type are the non-motorized sailboats that are brought to the launch site on trailers. However, because they are usually smaller boats without motors they do not successfully mix with motor boats. The special launch ramp for Hobie Cat sailboats at Michigan City, Indiana is an example of the type of facility for non-motorized sailboats.

The demand for these non-motorized craft has increased in recent years. The Hobie Cat launch ramp for Michigan City was built in response to that demand. Quantification of the demand is difficult since non-motorized craft are not required to be registered with the State of Indiana. The Chicago Park District currently has about 280 dry sail storage spaces for boats stored on trailers and launched using a hoist. This is about one dry stored sailboat for every 20 boats stored in slips. The cities of Evanston and Wilmette, two suburbs just north of Chicago, have extensive boat racks at their beach areas for storing the

smaller sunfish bype sailboats. Evanston has about 200 small boats stored in racks. Wilmette has almost 400 non-motorized sailboats stored at its beach area with a waiting list for storage space. About 270 are the smaller boats stored in racks, but there are also 130 Hobie Cat sailboats stored on the beach during the summer. In 1974 a Hobie Cat sailing club was founded in Michigan City with seven members. That club had grown to 43 boats by 1981.

It is estimated that dry storage for 30 to 50 sailboats should be provided at a Lake County marina facility and storage for 100 to 150 small sailboats stored in racks. The land area required for this dry storage is small, especially when compared to boats stored in slips. Consideration should also be given to a separate launch area for non-motorized sailboats, especially the Hobie Cat sailboats. These boats do not necessarily require a launch ramp but need access to the beach area for launching into the water.

6) Parking for Marina and Boat Launch

The amount of parking provided for the marina and for the boat launch will depend upon the number of slips provided in the marina and upon the number of boat launch lanes.

One parking space should be provided for each slip. Even though not all the boats are expected to be used at one time, guests and visitors will also require parking. Therefore the proposed marina should have 400 to 600 parking spaces for marina usage. An additional 50 to 75 spaces should be provided for non-boaters including sightseers and fishermen.

A minimum of 25 car and trailer parking spaces should be provided for each launch lane. A four lane boat launch ramp would thus require 100 car and trailer parking spaces and eight lanes would require a minimum 200 parking spaces.

C. Shore Fishing Facilities

Sport fishing in Lake Michigan has been experiencing increased popularity. This increased popularity is a result of a general improvement in water quality and and stocking programs by Indiana, Illinois, Michigan and Wisconsin. Fishing in Lake Michigan is now a year-round sport for many fishermen. During

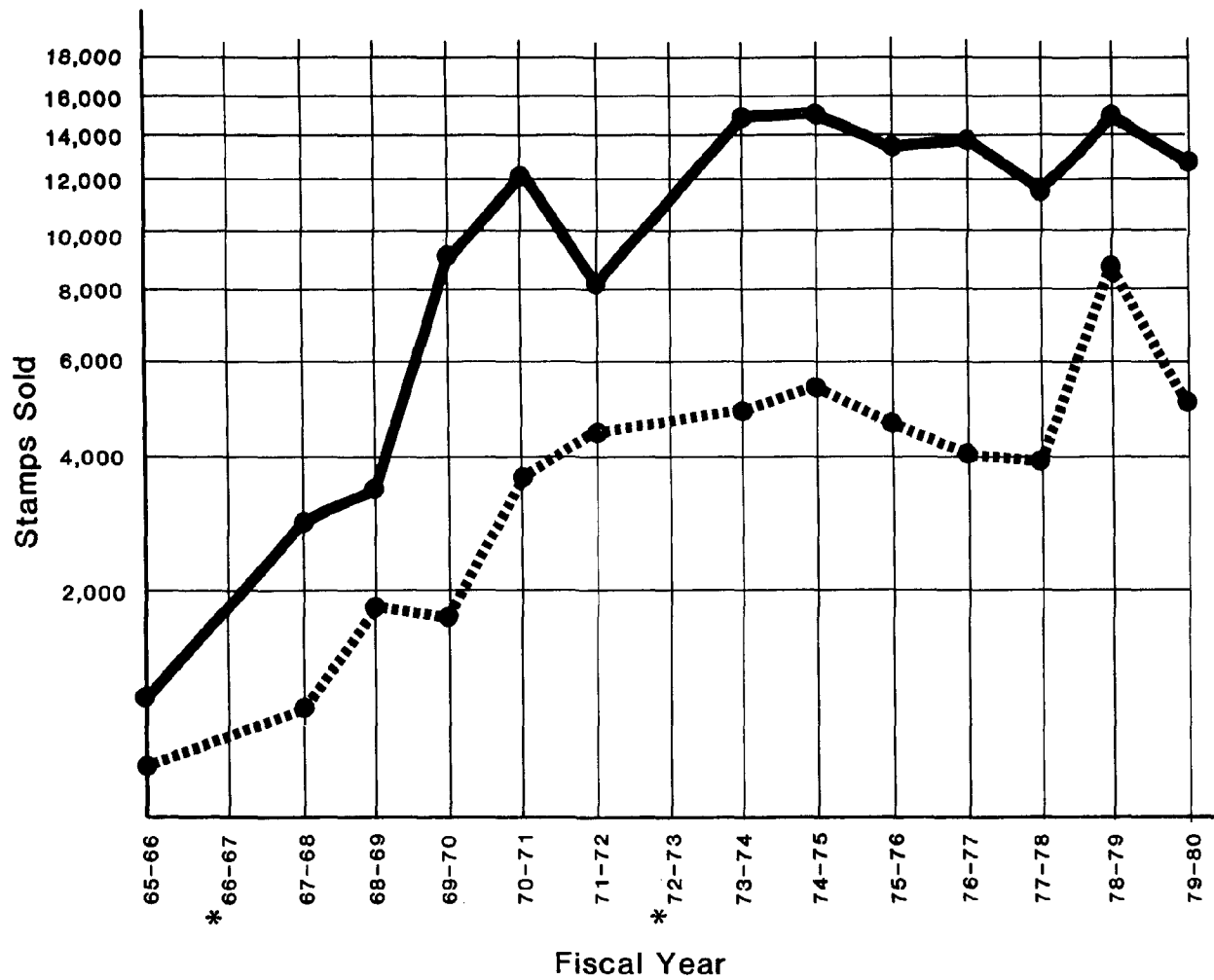
the winter months, fishing is restricted to the streams and the warm water discharges along the shoreline. Winter fishing usually yields catches of trout and coho salmon. Between March and mid-May coho salmon fishing occurs within 2 miles of the shoreline. The annual smelt "run" occurs in mid-March through April. Shoreline fishing activity is very high during the smelt run. As the water temperature rises the trout and salmon move off-shore into cooler, deeper water. Boat fishermen may travel out as far as 20 miles to catch trout and salmon. Shore fishing during the summer months continues with anglers catching yellow perch.

In autumn, salmon and trout start to return to the streams where they were stocked as fingerlings. Most fishing during this period is at the mouths of streams as the fish start their spawning runs. Boat and shoreline fishermen both enjoy success during this period.

The increasing popularity of Lake Michigan fishing is indicated by the increase in trout-salmon stamp sales. Trout-salmon stamps are required to legally catch trout and salmon. Figure 2 shows the increase in trout-salmon stamp sales for Lake and Porter Counties from 1965 through 1980. In recent years, the number of trout-salmon stamps sold has remained steady with the exception of a marked increase in 1978.

The Hammond Filtration Plant is the only shore fishing facility within the study area which enables fishermen to reach deep water. Fishing is allowed from the riprap along the perimeter of Filtration Plant. Parking is available for 10 to 20 cars along the east side of the plant. Fishing is allowed from the Hammond beach area and from the shore on the east side of the Filtration Plant. Fishing is also permitted from the Commonwealth Edison bulkhead just west of the study area and from Whiting Park just to the east. Whiting Park has a fishing pier that extends about 200 feet from the shoreline. Fishing is also available at the shore in Whiting Park.

The development of a marina facility will require that a protected water area be developed using breakwaters located in water that would vary between twelve and fifteen feet deep. Provision would then be made, to the extent practical, to provide access to the breakwater. Then fishermen would be able to reach this deeper water to fish.



# Trout-Salmon Stamp Sales Lake & Porter Counties 1965-1980

## Legend:

- Lake County
- Porter County
- \* Data Not Available

Figure 3

#### 4. FACILITY REQUIREMENTS

##### A. Fishing Facilities

Any marina facility would greatly enhance the opportunities for shore fishing in the marina vicinity. The main breakwater for primary shore protection for the harbor would probably be located 800 to 900 feet from shore in water that is 12 to 15 feet deep. This main breakwater could be as long as 1000 lineal feet and would be approximately parallel to the existing shoreline. Secondary wave protection would be provided by shore protection structures perpendicular to the main breakwater. The secondary protection could be connected to the shore. This would enable shore fishermen to reach the relatively deeper water along the main breakwater. The breakwater should be provided with posts and railings for safety so that, in the event of unexpected high waves, fishermen are afforded some protection.

##### B. Boat Storage Facilities

Provision will be made in the marina to accommodate motorized boats launched from trailers, power boats and motorized sailboats stored in water at slips, non-motorized sailboats stored on trailers at the marina site but launched using a boat hoist, and very small sailboats such as sunfish stored in tiered racks.

The boat launch ramp would be used by motorized boats, including sailboats, ranging in length from 16 feet to as long as 25 feet. The use of the boat ramp would be limited to motorized craft. Non-motorized craft, usually sailboats, would not be permitted to use the launch ramp because they cannot maneuver as easily as motorized craft and would interfere with the motorized boats.

The larger boats, ranging in size from 20 feet to as large as 50 feet would be stored in the water for the season at a slip. Boats between 20 and 25 feet in length would have the option of being launched or berthed in a slip, depending upon the availability of slip space and the type of boating done by the owner. These boats would be placed in the water each spring and removed each fall. During the winter months they would be stored on land, in a trailer or a specially constructed wooden cradle.

A separate storage area is desirable for nonmotorized sailboats. These are usually fixed keel boats that cannot be launched from a ramp. These boats are stored at the marina site on

trailers and usually placed into the water using a hoist. This area should be located convenient to the harbor entrance to minimize the travel distance to the Lake and possible interference with other craft.

The very smallest one or two person sailboats such as sailfish and sunfish are usually brought to the water on car top racks or stored for the season in tiered racks. These racks are usually located adjacent to a beach area. These smaller boats do not need the protection afforded by a breakwater and can be launched satisfactorily from a beach area.

#### 1) Boat Launch

It is recommended that four launch lanes be included in the project for trailered boats. A minimum of 25 car and trailer parking spaces should be provided for each launch lane. This is the minimum number of parking spaces recommended by the Corps of Engineers for this part of the Great Lakes. For four lanes a minimum of 100 car and trailer parking spaces would be required. If sufficient space is available, as many as 35 parking spaces should be provided for each launch lane built. Four lanes would not accommodate all the demand anticipated but are considered to be a reasonable compromise for this location which has a severely limited land area available for development.

It has been assumed in developing the facility requirements that the creation of new land by filling in Lake Michigan would be minimized and only used if necessary to provide the required support facilities, particularly parking.

#### 2) Boat Slips

It is recommended that boat slips be provided as shown by Table 9. The capacity of the harbor is assumed to be 400 boats in developing the facility requirements. The actual number of boat slips for the proposed harbor will depend upon site specific conditions.

TABLE 9  
NUMBER OF SLIPS BY SIZE FOR 400 BOAT MARINA

<u>Slip Size</u>	<u>Number of Slips</u>
50'	15
45'	30
40'	40
36'	105
30'	105
26'	105
Total	<u>400</u>

This distribution represents the full range of boat sizes expected to use the harbor but is heavily skewed to boats between 24 feet and 35 feet since these constitute the majority of the boats that would be expected to use slips at a marina facility on the south end of Lake Michigan. This distribution corresponds very closely with that at the existing Michigan City Washington Park marina. No differentiation is made between sailboats and power boats but it is anticipated that as many as 50 percent of the boats would be sailboats. A survey by the Consultant of the Milwaukee County lakefront marina facilities and of the Chicago Park District facilities indicates that approximately half the boats using slips or moorings are motorized sailboats. About one-third the slips at Michigan City are occupied by sailboats.

No piers should be specifically reserved for transient boaters. These are boats permanently based elsewhere but which are cruising and would be staying temporarily at the marina facility for one or more nights. Instead transient boaters can be accommodated at slips vacated by boaters who would be away from the harbor and whose slip would otherwise be unoccupied.

Depending upon the demand, slips can be rented out to charter boats. These are boats operated by private owners but rented on an hourly or daily basis by individuals or groups for fishing or pleasure cruising. They are usually operated by an experienced, licensed operator who pilots the craft. Charter boats thus provide the opportunity for people who do not own a boat to use one.

### 3) Dry Sail Storage

Approximately 100 storage spaces should be available for small sailboats stored on racks. Initially approximately 25 spaces should be provided and added to incrementally as the demand increases. These boats would be stored at a beach area rather than be directly associated with the marina. These boats are usually stored on metal frame racks. When not in use they are locked in place on the racks. The boats are carried from their racks and launched from the beach each time they are used. Each rack is about four feet wide and 12 to 15 feet long. A single rack usually holds three or four boats.

A storage area sufficient to store 30 to 50 sailboats on trailers is also required. Each boat stored on a trailer will require an area of about 250 to 300 square feet depending upon the size. In addition an aisle 20 feet wide is needed for maneuvering the boats to and from the boat hoist. This area should be equipped with a boat hoist so that the sailboats can be taken in and out of

the water each time they are used. A locked, fenced enclosure would be required to secure these boats.

4) Winter Boat Storage

It is recommended that winter boat storage not be incorporated into the proposed marina facility. Winter storage of boats in the parking lot would be unsightly especially for a public marina and park facility such as the one being planned. Also, the storage of boats would be incompatible with the recreational and park aspects desired for the lakefront. Boaters would probably winter store their boats at existing facilities, such as are now located on the Calumet River.

C. Other Marina Facilities

1) Control Building/Comfort Station

A single control building and comfort station will be required for the marina. At a minimum the functions to be provided are the following:

- o Office area for harbormaster and secretary
- o Small sales area for charts, maps and sundries
- o Men's and women's toilets, including showers
- o Laundry area with washer and dryer

It is estimated that a building with 1500 to 2400 square feet would be adequate to house the above functions. Another possible function to be included would be a concession area, or at least an area with vending machines to dispense beverages and food items.

2) Fueling Facilities

A fueling dock is required so that boaters using the marina can purchase fuel for their boats. It is anticipated that the fuel pumps would be located at the end of one of the piers. The fuel storage tanks would be located underground on the shore. It is estimated that a fuel storage capacity of approximately 10,000 to 20,000 gallons would be required. This capacity would require the tank to be filled every one or two weeks during peak periods of marina usage.

3) Public Utilities

It is anticipated that each slip would be equipped with electrical power to be a source of auxiliary power for the boat while it is at its berth. The size will range from 30 to 50 amps depending upon the slip length and

boat size. A hose bib would also be provided for each slip to provide potable water. Water would also be required to serve fire hose cabinets located at intervals along the main piers as required by local and state building ordinances. In addition, the comfort station building would require electricity and water.

A sewer would also be required for the building. Depending upon the site chosen, it may also be necessary to provide a lift station to pump the sewage into the local system. The marina would also require a pumpout facility for removing sanitary wastes from boat holding tanks. Usually the pumpout facility is placed on the fueling dock so that both are in a single location.

4) Lighting

Security lighting would be required along the main piers in the marina so that sufficient illumination would be available to persons walking along the piers in the evening. The parking lot should also be lighted for security reasons using light standards with an efficient light source. One or two lighting standards should also be provided at the boat launch facility. During the fishing season many boaters launch their boats very early in the morning and sometimes retrieve them after dark. Lighting is therefore very desirable in the launch area.

Navigation lights will be provided at the breakwater ends to meet U. S. Coast Guard requirements. The number to be provided and their locations will be determined by the Coast Guard after the harbor plans have been developed and the breakwater configuration established.

5) Public Observation Points and Linkages

Opportunities will be provided in the marina so that the boating public has access to the water's edge. This can be in the form of a publicly accessible walkway along the shore and in the use of the top surface of the breakwater for pedestrian activity.

The shoreline available for development is very narrow. If practical, vehicular linkage will be provided along the entire study area. At a minimum, provision will be made for pedestrians and persons using bicycles and other forms of non-motorized transportation to traverse the entire shoreline. A two lane access road will be built to provide access between the marina and the adjoining streets.

#### 6) Dredging

The lake bottom in the study area has a relatively gentle slope. The water depth is about five to seven feet deep 500 feet from the shore and 12 to 14 feet deep 1000 feet from the shore. Any marina development in the study area will require some dredging, particularly closer to shore, to provide sufficient depth for boat storage. A harbor accommodating power boats and sailboats as large as 45 to 50 feet long will require a water depth of six to seven feet.

The level of Lake Michigan fluctuates from year to year and from season to season. The level of the lake has varied historically from as high as +4LWD (four feet above the low water datum) during periods of high water to as low as -1LWD, a variation of five feet. The harbor must be deep enough so that at times of low water there is still enough clearance for the keels of the larger boats. A dredge depth of -7LWD to -8LWD would be needed to provide the required clearance. The estimated quantity of material to be dredged is determined in a subsequent section of this study as the master plan is developed.

#### D. Park Facilities

The area available for park facilities is limited so that activities such as softball, tennis and baseball or other active sports which require relatively large areas, would not be appropriate or cost effective as part of any proposed lakefront development in this location. The property available for development lends itself to activities such as sightseeing, bicycling, hiking and roller skating, among other.

Appropriate facilities to be considered for the proposed park along the lakefront are the following:

- Small picnic areas
- Playground equipment
- Benches and areas for sitting and sightseeing
- Bicycle/pedestrian paths
- Drinking fountains
- Swimming beach
- Bathhouse/comfort station
- Lighting for bicycle/pedestrian path
- Landscaping, including visual buffer between railroad tracks and lakefront.
- Physical fitness course

Other considerations for park development include the protection of existing natural areas, such as the small dune development of the west end of Whihala Beach Park.

E. Parking Facilities

Adequate public parking is required for operation of a successful marina. Ideally, one parking space should be provided for each slip. Not all boaters will be using their slips at the same time; however, visitors and guests of boaters will increase the requirement to approximately one space per slip.

Parking would also be required for shore fishermen and other visitors to the marina, including the people using the sailboats stored on trailers. It is estimated that 50 to 100 additional parking spaces would be needed to accommodate these other users of the marina facilities. Therefore, for a 400 slip marina facility it is recommended that approximately 500 spaces be provided and that for a 600 slip marina, approximately 700 parking spaces be provided. These parking facilities would be adequate for normal summer usage. However, during peak summer weekends parking would probably become crowded, especially when the fishing activity is also heavy, as in midsummer when the perch fishing is at its peak.

Parking for the other recreation facilities would depend upon the actual facilities included in the development plan. Approximately 25 parking spaces should be provided for each mile of pedestrian/bicycle trail. It is anticipated that the new parking lot for Whihala Beach could also serve for parking and access to the park areas from the Whiting end of the study area.

## 5. SITE EVALUATION

### A. Site Descriptions

The study area includes the Lake Michigan shoreline between the NIPSCO property in the City of Hammond on the west and Whiting City Park on the east. This study area has been divided into four separate sites for evaluation. The locations of the sites are shown by Figure 4. The primary emphasis in evaluating and ranking the sites has been upon the requirements for developing the marina portion of the master plan. The requirements for the marina are much more critical to location than are the other recreational aspects of the plan.

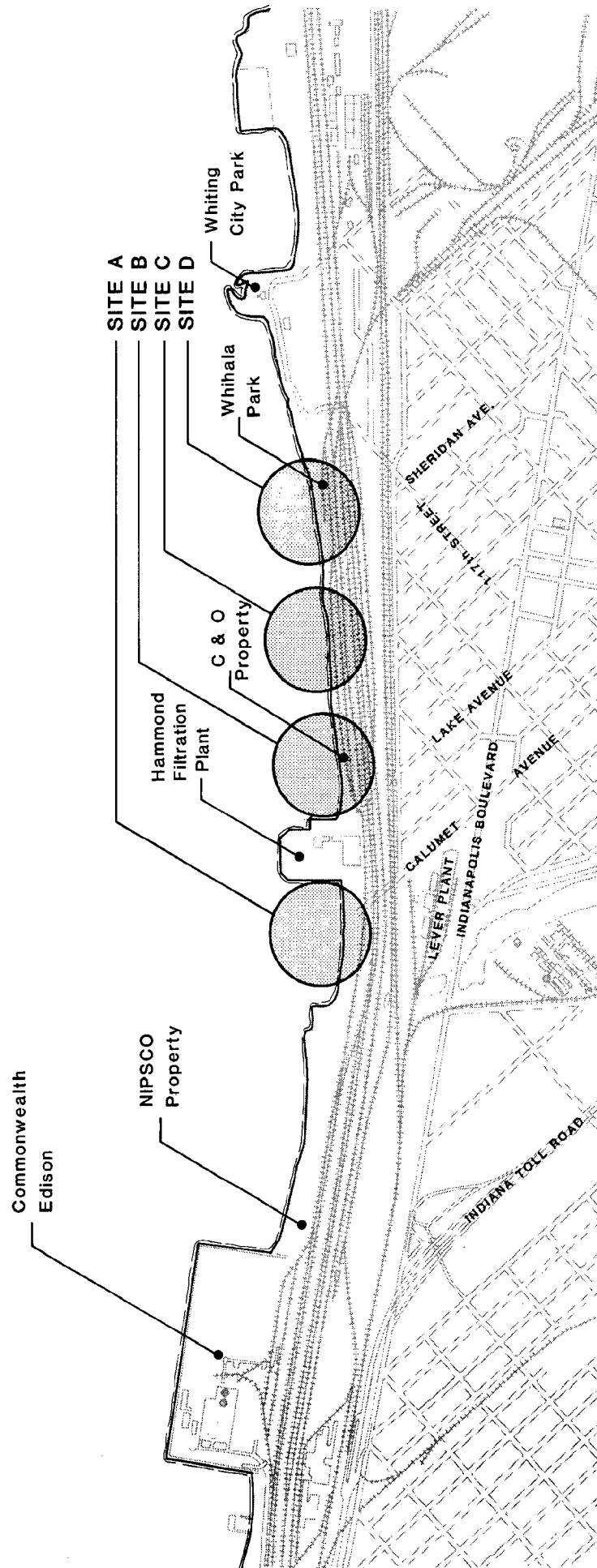
Site A is located between the NIPSCO property on the west and the Hammond Filtration Plant on the east. This property is currently owned by the City of Hammond. Site B consists of the area immediately east of the Hammond Filtration plant up to the Hammond chlorinator building. The property is presently owned by the Chesapeake and Ohio Railroad Company. Site C is the area between the Hammond chlorinator building and the west property line of Whihala Park. This property is also owned by the Chesapeake and Ohio Railroad Company.

Site D encompasses all of Whihala Beach Park. The Whihala Park property runs from Sheridan Avenue extended on the west to Whiting City Park on the east. Whihala Park is owned and operated by the Lake County Parks and Recreation Department.

### B. Methodology

The four sites were evaluated for a marina/park using the following factors:

- o Shore Protection Provided by Existing Facilities
- o Accessibility
- o Impact on Present Recreational Land Use
- o Utilities
- o Land Area for Support Facilities
- o Impact on Natural Features
- o Future Impacts from Industrial Development
- o Impact on Adjacent Land Uses



**FIGURE 4**

# POTENTIAL SITES FOR LAKE COUNTY MARINA FACILITY



Each of these factors were ranked according to their importance. Those factors considered most important received a total possible score of 100 points and the factors considered less important received lesser values. Evaluations were established as "excellent", "very good", "good", "fair", and "poor". These evaluations are modified slightly for the three factors: "Impact on natural features", "Future impacts from industrial development", "Impact on adjacent land uses". These modifications are as follows:

High impact	=	Poor
Medium Impact	=	Fair
Low impact	=	Good
Slight impact	=	Very good
No impact	=	Excellent

Point scores are assigned by dividing the maximum point score for each factor into four equal parts, with poor equal to zero, fair equal to 25% of the maximum value, good equal to 50% of the maximum value, very good 75% of the maximum value and excellent 100%. The point scores are then totaled to produce a numerical score for each site. A maximum total of 600 points are possible.

#### C. Ranking of Factors

The two factors considered most important for site selection are shore protection provided by existing facilities and accessibility.

Construction of breakwaters to provide a calm harbor for a marina is one of the most expensive items for any new marina. Using existing structures to provide protection on one or more sides was considered an advantage. A site with protection from two sides would be considered ideal and would be given the maximum point score. Sites with no existing protection from waves were considered less than ideal and sites with existing protection from one direction were given 50 points or half the maximum score.

The majority of users of a marina/park development can be expected to arrive by private automobile using the existing street system. Sites with direct access using existing streets now passing through areas used for commercial or industrial uses were given the maximum points. Sites with direct access, but using streets passing primarily through residential areas would be given a lower score. Finally, a site not directly accessible by existing streets would be given the lowest score.

Next in order of importance are impact on present recreational land use, utilities, area available for support facilities and impact on existing natural features. These four factors were each given a maximum possible score of 80 points. Recreational opportunities on or adjacent to Lake Michigan in Lake County, Indiana are limited. Therefore, developing a marina on an existing park site was considered less than ideal and the points were reduced accordingly.

The railroad tracks present obstacles for installing new utilities. Installation of new water and/or sewer lines under existing railroad tracks would be very expensive. Sites that could reasonably be expected to tie into an existing water or sanitary line located on the north side of the tracks were given a higher score than sites which would definitely require new water or sanitary sewer lines. Twenty points were given for each of four utilities needed for any proposed development, sewer, water, electrical service and telephone, with an appropriate reduction for each utility not available.

Since most people will arrive at the marina/park by automobile, a parking lot close to the slips or moorings is important. A control building is also needed for the effective operation of a marina. Sites lacking adequate land area for these support facilities were considered less than ideal and their scores were reduced accordingly. It is estimated that a minimum of 8 to 10 acres of land would be required for a 400 slip marina facility.

Little of the Lake Michigan shoreline in Lake County, Indiana remains in its natural state. The development of a marina on a site containing natural features is not desirable and the score was reduced accordingly.

Criteria weighed lowest in importance are possible future development impacts and impact upon adjacent land uses. The development of a marina/park could also affect uses of adjacent land. If the location of a marina on a site might have a negative impact on a neighboring site, this was taken into consideration by reducing the point score accordingly.

The possibility of other future developments on adjacent land was examined. A new industrial type development located in proximity to a marina could have an adverse effect. Possible future development refers to projected industrial development that could have an adverse effect on a park/marina facility.

One factor not explicitly included in the site evaluation has been a comparative analysis of the lake bottom sediments at each location. The reason for this is that recent bottom samples are not available for all the sites. Obtaining them is beyond the scope of this project. Bottom samples were taken at Site A in October, 1977 for the "Environmental Impact Assessment" prepared by D'Appolonia Associates for the 1975 marina project. This project was to have been located on the NIPSCO property, east of the Commonwealth Edison break-water. Five grab samples were taken and analyzed for ten parameters including volatile solids, oil and grease, organic nitrogen, PCBs, lead, mercury and zinc. Two of the sample locations are located adjacent to Site A. Based upon the results of their analyses, D'Appolonia indicated that the volatile solids concentrations were on the borderline of the EPA criteria and zinc is the only element that exceeded federal standards. These sediments would therefore not be suitable for beach fill but might be used for landfill behind any bulkhead depending upon requirements of the federal and state agencies.

Bottom samples were also taken at Whiting Park for a 1980 study of Whiting Park. Two samples were taken adjacent to Whihala Beach Park. These samples were only analyzed for their organic content and grain size distribution. The samples off-shore had three to four percent organic content. These analyses do not seem to preclude use of any dredge material from the small boat harbor to be used as fill material; nor do they indicate any substantial comparative advantage to one site.

#### D. Ranking of Sites

##### 1) Site A

Site A received 410 or 390 points depending upon whether the existing Hammond Filtration sewer can be used, and ranked second in the site evaluation scoring as shown by Table 10. The site is currently owned by the City of Hammond. The property is now used as a public park site with a large beach area. However, the park is not well utilized at this time. The water quality has not been good enough in recent years to allow swimming and there are no support facilities available.

The site does have some protection from wave action with the Hammond Filtration Plant immediately to the east. Accessibility to Site A is the best of the four sites by way of Calumet Avenue.

**TABLE 10**  
**SITE EVALUATION FOR LAKE COUNTY MARINA**

Criteria	Total Possible Points	SITE A West of Filtration Plant			SITE B East of Filtration Plant			SITE C West of Whihala Beach			SITE D Whihala Beach		
		Evaluation	Percent	Points	Evaluation	Percent	Points	Evaluation	Percent	Points	Evaluation	Percent	Points
Shore Protection Provided by Existing Facilities	100	Good	50%	50	Good	50%	50	Poor	0	0	Poor	0	0
Accessibility	100	Excellent	100%	100	Very Good Good	75% 50%	75 50	Poor	0	0	Good	50%	50
Impact on Present Recreational Land Use	80	Good	50%	40	Excellent	100%	80	Excellent	100%	80	Poor	0	0
Utilities	80	Excellent Very Good	100% 75%	80 60	Excellent Very Good	100% 75%	80 60	Good	50%	40	Good	50%	40
Land Area for Support Facilities	80	Fair	25%	20	Excellent	100%	80	Excellent	100%	80	Good	50%	40
Impact on Natural Features	80	Excellent	100%	80	Very Good	75%	60	Fair	25%	20	Poor	0	0
Future Impacts from Industrial Development	40	Poor	0	0	Good	50%	20	Very Good	75%	30	Excellent	100%	40
Impact on Adjacent Land Uses	40	Excellent	100%	40	Excellent	100%	40	Fair	25%	10	Fair	25%	10
TOTAL POINTS PERCENTAGE	600			410			485			260			180
				68.3%			80.8%			43.3%			30%

All four utilities are available at the site. The Hammond Filtration Plant sanitary line is approximately 1000 away and may be available, but would be further away than the site B. Water service is available in Calumet Avenue. The site was given two scores for this criteria; one if the existing sanitary line can be used, another if it would not be available.

The land area for support facilities at Site A is the least of the four sites with only four acres of existing land available. There are no significant natural areas located at Site A. A sandy beach is located at the site, and, even though it is currently underutilized, it is worth preserving as an existing recreation area. It could be expected that opposition would be encountered if it were taken. For these reasons this site has received a 50 percent score for impact on present recreational land use.

The property west of the site is owned by NIPSCO. NIPSCO holds a permit for a land fill in Lake Michigan for a new electric generating plant. If a new generating plant is constructed the possibility exists that it may adversely affect Site A. The new plant might require increased rail lines and/or truck traffic that could affect Site A. A marina development at Site A would not significantly affect adjacent land uses.

2) Site B

Site B received the highest score of the four sites as shown by Table 10. The site received 485 points of the maximum 600 possible points or an 80.8% percentage score. This score is contingent upon using the existing forced sanitary sewer of the Hammond Filtration Plant and if the existing road south of the Filtration Plant can be used for marina traffic. These two conditions would require that appropriate agreements be arranged with the City of Hammond and the E, J and E railroad. If both these conditions could not be met, Site B would receive a score of 73.3% or still higher than the highest possible score for Site A of 68.3%.

Site B is presently owned by the Chesapeake and Ohio Railroad. The site is not occupied by any buildings or other facilities. The proximity of the Hammond Filtration Plant offers the possibility of using their landfill for partial protection from wave action. Additional breakwaters would be necessary but these could also be tied into the Filtration Plant land fill.

Access to the site could be by way of Calumet Avenue. Traffic to and from the site would use the roadway located south of the Filtration Plant if a mutually acceptable use agreement can be arranged between the County and the Hammond Filtration Plant and the E, J and E railroad. This access route is preferred over using Lake Avenue because the land use along Lake Avenue is largely residential as opposed to industrial and commercial along Calumet Avenue. Calumet Avenue is also wider than Lake Avenue.

All four utilities are available at the site. Water is available from the Hammond Filtration Plant. Electricity is available at this site as well as all sites along the study area. The Hammond Filtration Plant has a six inch forced sanitary sewer line connecting with the Hammond Sanitary District system. The sewer line runs from the Hammond Filtration Plant along Lake Avenue under the railroad tracks. The line connects with the Hammond Sanitary District's system at Lake Avenue south of the railroad tracks. If this sanitary facility can be used, Site A receives the maximum of 80 points for this factor. If not, 60 points would be attributed for this category.

This site has approximately 12 acres, including the entire C & O acquisition. This is the maximum land available at each of the four sites, and, therefore, the maximum of 80 points were given.

The shoreline at Site B consists of a gravel beach with pieces of broken concrete and rubble. The present unsightly condition of the shoreline would be improved with the location of a marina there. There are no natural areas included within this site; however, because a marina at this site might have an effect on the small dunes to the west, only 60 points were given for this criterion. The planned NIPSCO expansion/land fill is far enough away to have less effect on Site B than Site A but not so far away that some effect would not be felt, particularly from wind blown particulates from the exhaust stacks.

The development of a marina would not significantly affect operations at the Hammond Filtration Plant. Most of the plant's intake cribs are located far offshore. A marina/park development would have little impact upon these intake cribs. There are two intake pipes for the Filtration plant. One is a 42 inch concrete pipe and the other is a 60 inch cast iron pipe. Both of these pipes are located west of the marina site. The proposed marina development would not be expected to have an effect on these pipes.

The site is presently owned by the Chesapeake and Ohio Railroad. The Lake County Parks and Recreation Department has condemned the C & O property and is currently negotiating with the railroad to obtain the property. If the negotiations are successful and the Lake County Parks and Recreation Department can acquire this property, Site B would be the best site for a marina/park.

3) Site C

Site C and D ranked much lower than sites A and B. Site C had a score of 260 points or 43.3 percent. The construction of a marina at Site C is impractical for many reasons.

The site is presently owned by the Chesapeake and Ohio Railroad Company. The Hammond chlorinator building is located on this site but otherwise the site has no buildings on it. This can be considered one of the few positive factors for considering a marina at this site.

There are no existing structures which provide protection from wave action. Construction of breakwaters on three sides would be required.

Accessibility to the site is poor. Automobiles would be required to enter from the east through Whihala Park or from the west along the shore. The increased traffic through Whihala Beach Park could affect the use of the park. The other access route would be from Calumet Avenue. This would require a long drive through the western portion of the C & O property as well as a new access road.

Other than electricity and telephone, there are no utilities readily available at the site. The closest available water supply line would be at the Hammond Water Filtration Plant. A two inch water line exists in Whiting City Park. The line is old and inadequate in size and pressure and is located approximately 1,700 feet from the eastern end of the site. Sanitary sewer connections would need to be augered under the railroad tracks to connect with the Hammond Sanitary District's system or a line over 2000 feet long would be required to connect to the Hammond Sanitary District line.

The land for support facilities is excellent, however, with over 12 acres available if the C & O property is acquired.

The eastern portion of the site has several dune-like formations. These formations while not extensive are unique in the study area. Disrupting these formations would be less than ideal.

There are no known future development plans immediately adjacent to the site that could adversely affect a marina/park constructed at Site C. However, ten points were deducted for NIPSCO construction for possible adverse effects due to particular matter from the coal fired generating plant. A marina development at Site C would have an impact on Whihala Park. The need for access through the park could disrupt planned uses of Whihala Park. A chlorinator building and an outfall crib exist at Site C. The structure is used to chlorinate treated storm water before discharge into Lake Michigan. The chlorinator is owned and operated by the Hammond Sanitary District. This chlorinating facility would need to be relocated if a marina is developed at Site C.

4) Site D

Site D is Whihala Beach Park. The site received 180 Points in the evaluation process or a 30 percent score.

Whihala Park is owned and operated by the Lake County Parks and Recreation Department. Future plans for the park include: a two lane boat launch ramp, rubble mound breakwater, car and trailer parking, comfort station with concession and lifeguard area and separate parking for use of swimming beach. The use of this existing recreation site is considered poor, since it would eliminate the best natural beach area open for swimming in the study area.

There is no existing protection from wave action at Whihala Park. The construction of breakwaters on three sides would be required to provide a calm harbor.

Accessibility to Whihala Park is good. White Oak Avenue crosses the railroad tracks immediately east of the park. White Oak Avenue south of the tracks is a residential street. A preferred access route would be through commercial and/or industrial land. A score of 50 percent was given to reflect this access through a residential area.

Availability of utilities again presents problems. Electrical power and telephone are available at Whihala Park. The previously mentioned two inch water line does exist at White Oak Avenue. The two inch line would be inadequate for use by a marina development. A well or new water line would be required to meet the water demands of a marina. There are no existing sanitary sewer lines close to Whihala Park. Sewage disposal would require the use of holding tanks or construction of a new sewer line. The land available for marina support facilities would be approximately eight acres. This is less than the 12 acres available at Sites B and C, so the point score was reduced to 50 percent.

In the western portion of Whihala Park there are the beginnings of small dune formations. These dune formations are unique within the study area. The disruption of the dunelike area for a marina development would not be desirable.

There are no known developments planned on adjacent land uses that would significantly affect the construction of a marina at Site D. This site is the farthest from the proposed NIPSCO and consequently no points were deducted for its impact.

The construction of a marina would have some impact upon adjacent land uses. A slight impact may be felt by the residents of White Oak Avenue south of the railroad tracks because of the increased automobile traffic and there would be a definite impact upon use of Whiting Park.

#### E. Summary

The site located east of the Hammond Filtration Plant is, therefore, the site best suited for development of the proposed marina/park, contingent upon results of the condemnation suit to acquire the C & O property. Should efforts to acquire that property not be successful the Hammond site would then be the next best location for the marina.

## 6. MARINA MASTER PLAN

### A. Preliminary Plans

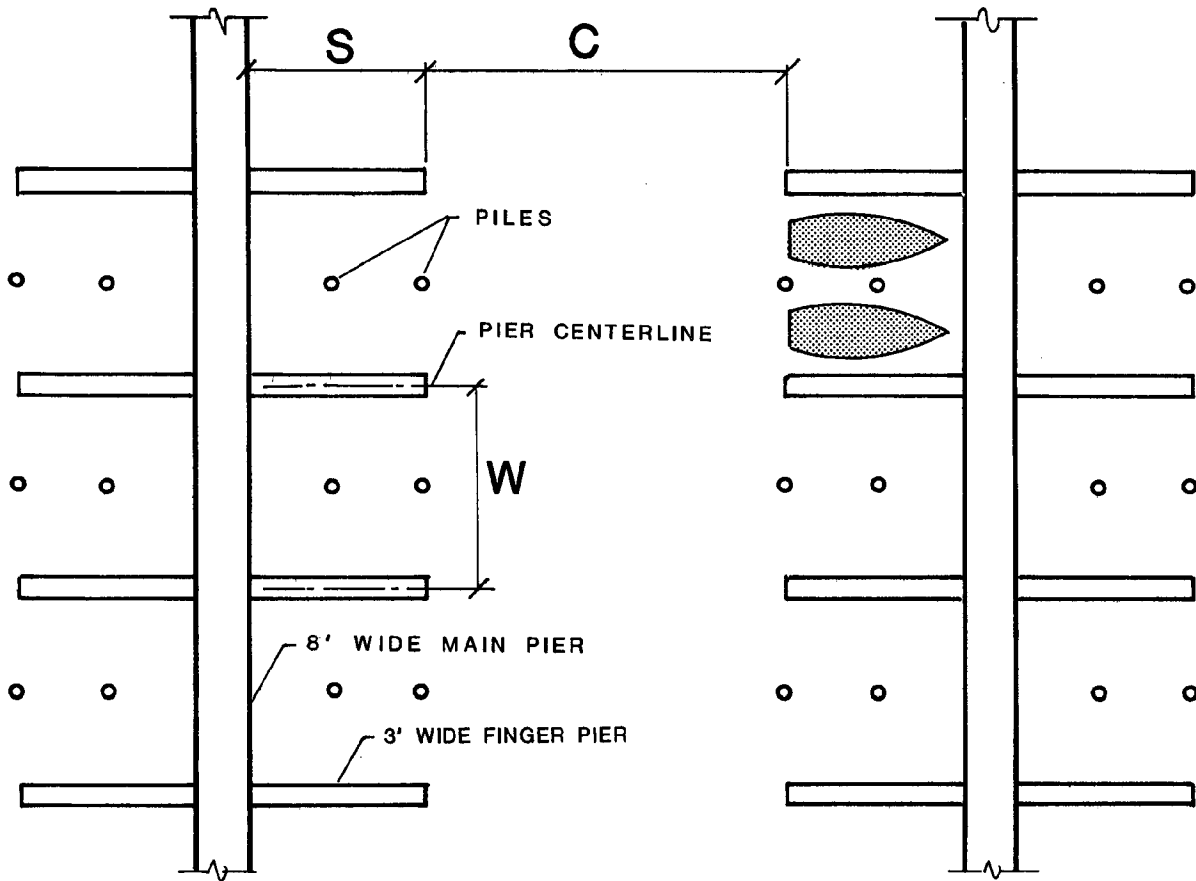
Seven preliminary marina plans were developed for Site B, the recommended marina site located east of the Filtration Plant. These alternative plans are shown in Appendix D, Figures D-1 through D-7. These plans represent possible development alternatives at the recommended site. Schemes A, B, C, D and E are similar in that the boat slip distribution closely corresponds to the one shown in Table 9 with slips ranging in size from 50 feet long to 26 feet long. Schemes F and G only have boat slips 40 feet long or smaller to indicate what effect this would have on marina cost and size. The typical boat slip dimensions for the marina schemes are shown by Figure 5.

A comparison of the seven alternative concepts is shown by Table D-1, Appendix D, including a comparative cost estimate for each scheme. The detailed cost breakdown is shown by Table D-2, Appendix D. The comparative cost estimates include the major cost items that would vary from scheme to scheme. It does not include the items that would not be expected to vary substantially from scheme to scheme, such as the boat slips, parking, launch ramp and control building.

The major costs that differ for each concept are the break-water, depending upon length and water depth, length of bulkhead and the amount of dredge material. It has been assumed in developing these cost estimates that dredge material can be used to create filled land for parking. The amount of dredge material has been estimated for each site using lake survey charts for the Hammond/Whiting area published by the Department of Commerce. A dredge depth of -8'LWD has been assumed so that at least one foot clearance is provided for the keels of large boats during periods of low water. The material that could not be disposed of on-site has been assumed to be trucked off the site to a suitable dump site. It is anticipated that the bottom material be dredged would be suitable for lake fill. This assumption must be verified by obtaining bottom samples and testing them to see whether they conform to federal, state and local standards.

### B. Marina Master Plan

The final plan for the marina is based on the analysis of the alternative concepts and upon meetings with Lake County Parks and Recreation staff to evaluate the concepts. The master plan solution is a consensus solution combining features of several of the alternatives.



SLIP SIZE-S	SLIP WIDTH-W	CLEAR FAIRWAY-C
26'	29'	50'
30'	32'	58'
36'	35'	70'
40'	40'	80'
45'	45'	90'
50'	45'	100'

Figure 5  
TYPICAL BOAT SLIP DIMENSIONS

The master plan concept for the marina is shown by Figure 6. The main breakwater is attached to the Hammond Filtration Plant so that it can be used by fishermen. This breakwater provides the primary protection for the harbor from the most severe storms from the north and the northeast. The secondary breakwater is located at the east end of the harbor and provides protection from waves coming from the east. Both breakwaters are assumed to be constructed of large natural stones weighing as much as five tons. Recent experience by the Consultant indicates that this method is the least expensive solution for such a structure at the water depths expected at this site. Also the rubble mound breakwater provides energy absorbent material within the harbor so that any waves generated within the harbor are not reflected back through the harbor.

The marina master plan consists of 386 slips ranging in size from 26 feet long to 40 feet long. It should be noted that no slips over 40 feet long have been included in the marina master plan. The reason for this is that the comparative analysis of the alternative concepts indicated a significant cost reduction for the two schemes (Schemes F and G) that did not have these two larger slip sizes. Also, discussions with the Michigan city Port Authority indicated that several of their 50 foot long slips were being filled with somewhat smaller boats than could actually be accommodated. The slip sizes provided would be suitable for all but the very largest size boats which constitute only a small percentage of the total boats stored in slips or moorings. A tabulation of the number of slips and parking spaces for the marina and the boat launch area are shown by Table 11.

TABLE 11  
FACILITIES FOR MASTER PLAN

Number of Slips

26'	-	134
30'	-	116
36'	-	116
40'	-	<u>20</u>
Total Slips		386

Parking spaces	471 spaces
Ratio - Parking Spaces per Slip	1.22 parking spaces per slip
Launch Lanes	4 Lanes
Car and Trailer	119 Spaces
Parking Spaces	
Ratio - Car and Trailer	30 Car and trailer spaces
spaces per launch lane	per launch lane

Approximately 470 automobile parking spaces are provided by the master plan. Assuming a one to one ratio for the boat slips, some 84 spaces would be available for fishermen and other non-botating visitors to the lakefront during periods of peak marina use.

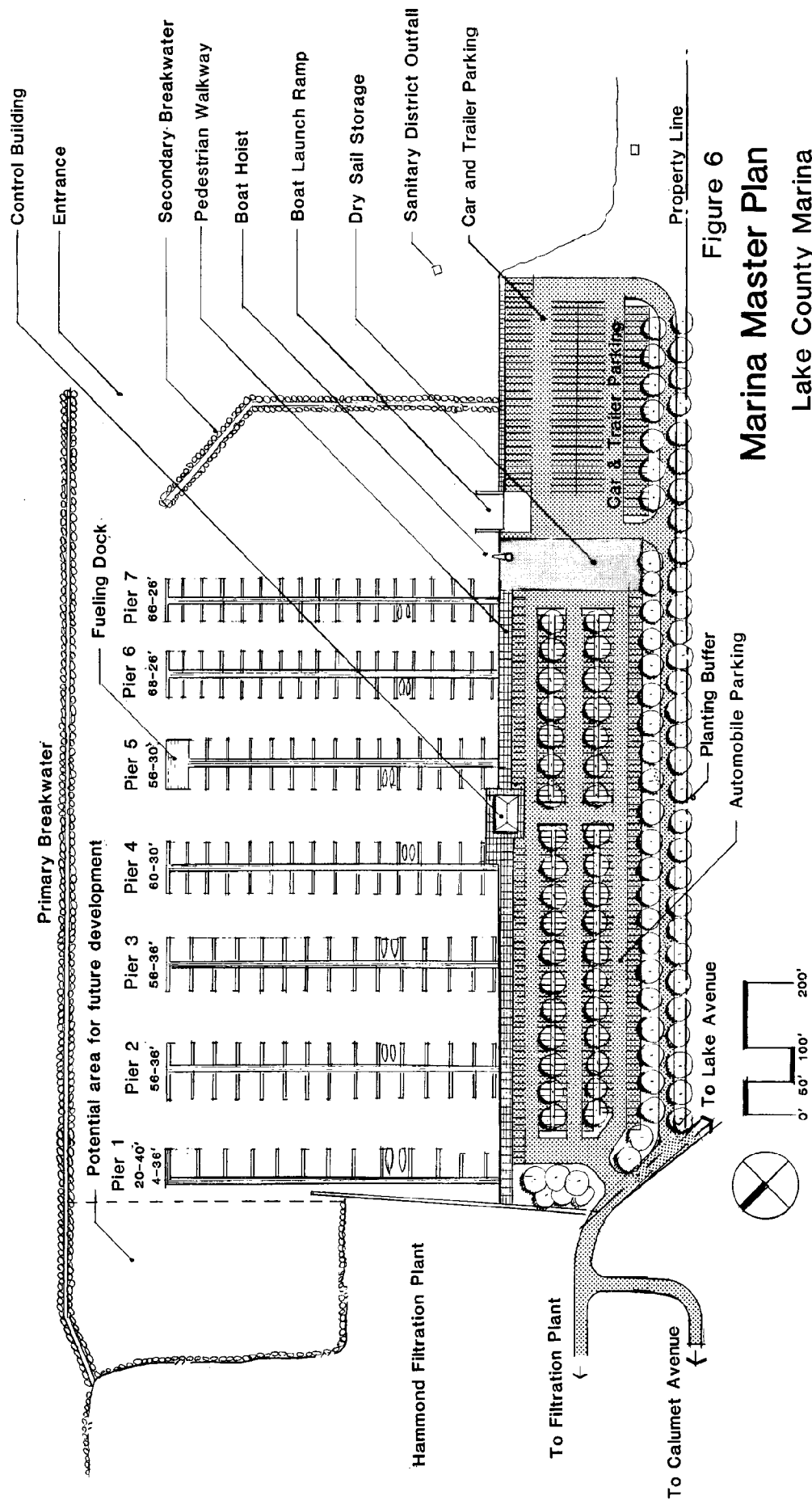


Figure 6

# Marina Master Plan

Lake County Marina

Ralph Burke Associates

The marina area consists of seven main piers which extend approximately 500 feet from the parking area. The main piers would be eight feet wide to allow enough clearance for persons carrying boating gear to pass each other comfortably walking in opposite directions.

A single three foot wide finger pier would be provided between each two slips with driven piles separating each two boats to prevent possible damage to adjoining boats if a line should break. Each slip would be provided with permanent electric and water lines. Provision for telephone hookup and cable television should also be considered for boats 36 feet and larger. The fairway, the clear channel between the ends of the finger piers, should be wide enough to permit boats leaving their berths to do so without damaging the operator's boat, other boats tied up at slips and without undue inconvenience to the operator. For design purposes a clear distance of approximately twice the slip length has been used. The slip dimensions and fairway width for each size slip are shown in Figure 5. It should be noted that the slip length refers to the length of the slip and not to the length of boat accommodated in that slip. For instance a 32 foot boat would most appropriately be berthed in a 36 foot slip, allowing three to four feet for movement. This prevents the bow of the boat from striking the dock and assures that the stern will not protrude into the fairway where it could be struck by another boat.

Landside support items for the marina include a control building, parking and fuel dock. The control building is centrally located to provide an unobstructed view of the entire harbor. Contained in this building would be an office for a harbor master and an administrative assistant, rest rooms, vending machines and a small store for selling convenience items to boaters. The control building will also contain showers and laundry facilities for slip renters and transient boaters.

A fueling dock and sanitary pumpout facility are located at the end of Pier 5, with temporary storage available for about four boats, depending on their size. The pier serving the fueling dock would be ten feet wide to allow for increased pedestrian traffic on this pier which provides a direct connection between the control building and the fueling area. Located on the fueling dock would be a small shelter building for the person operating the fuel pumps and the sanitary pumpout.

The launch ramp and the car trailer parking are shown separated from the other marina activities at the east end of the marina to avoid potential conflicts between the two activities. Each launch lane should be about 15 feet wide to allow enough space for boaters to launch. The ramp slope to the water would be about 15 percent. Traffic flow in the launch area would be one way in a counter clockwise direction for boats being launched or retrieved.

The area for dry sail storage would be located between the boat slip area and the launch ramp. About 50 boats on trailers could be stored in the area provided. A hoist would be provided at the bulkhead to place and retrieve the sailboats.

No provision has been made at the marina area to store the very small non-motorized sailboats. These boats are more appropriate to a beach area and with that in mind it is recommended that these boats be stored at the east end of the site at Whihala beach.

It should be noted here that as discussed in the Foreword to this study a two lane boat launch ramp and breakwater are to be constructed at Whihala Beach Park at the east end of the study area. This ramp will be used for motorized boats. In the future when the four lanes are opened at the marina site on the west end of the study area six launch lanes will be available at this location. The demand analysis indicates that six launch lanes can be supported in this location. The two locations can continue to be operated for motorized craft. Another alternative would be to have the facility at Whihala Beach become a ramp for exclusive use of non-motorized sailcraft such as Hobie cats.

C. Park Between Marina and Whihala Beach

The entire lakefront master plan including the park area between the proposed marina and Whihala Beach Park is shown by Figure 7. This area is envisioned as a linkage or connection between the other two major elements; the marina and Whihala Beach. An access road is shown along the shore. This paved road is not intended to be used as a vehicular thoroughfare, but would be limited to use by emergency and maintenance vehicles. Bollards or other control devices would be needed at each end to prevent unauthorized use by passenger vehicles.

This paved road linking the two areas would be used by bicyclists, joggers and pedestrians. A buffer of landscaped hills and vegetation is shown located between the railroad property and road to screen the tracks and provide a more attractive visual experience with a lake orientation for those persons using the park. The beach along the shoreline extends almost 1000 feet west of the existing Whihala Beach property and would provide an extension of the existing beach area. There are several small dune formations at this location.

These dune formations would be allowed to remain and disturbed as little as possible. A small picnic area and vista is shown just east of the boat launch area for use by fishermen and other park users. Some shore protection measures would also be required at this location to prevent possible erosion due to concentration of wave forces in this corner. The shore protection would consist of large natural stones weighing up to several tons similar to the stones used to construct the breakwater.

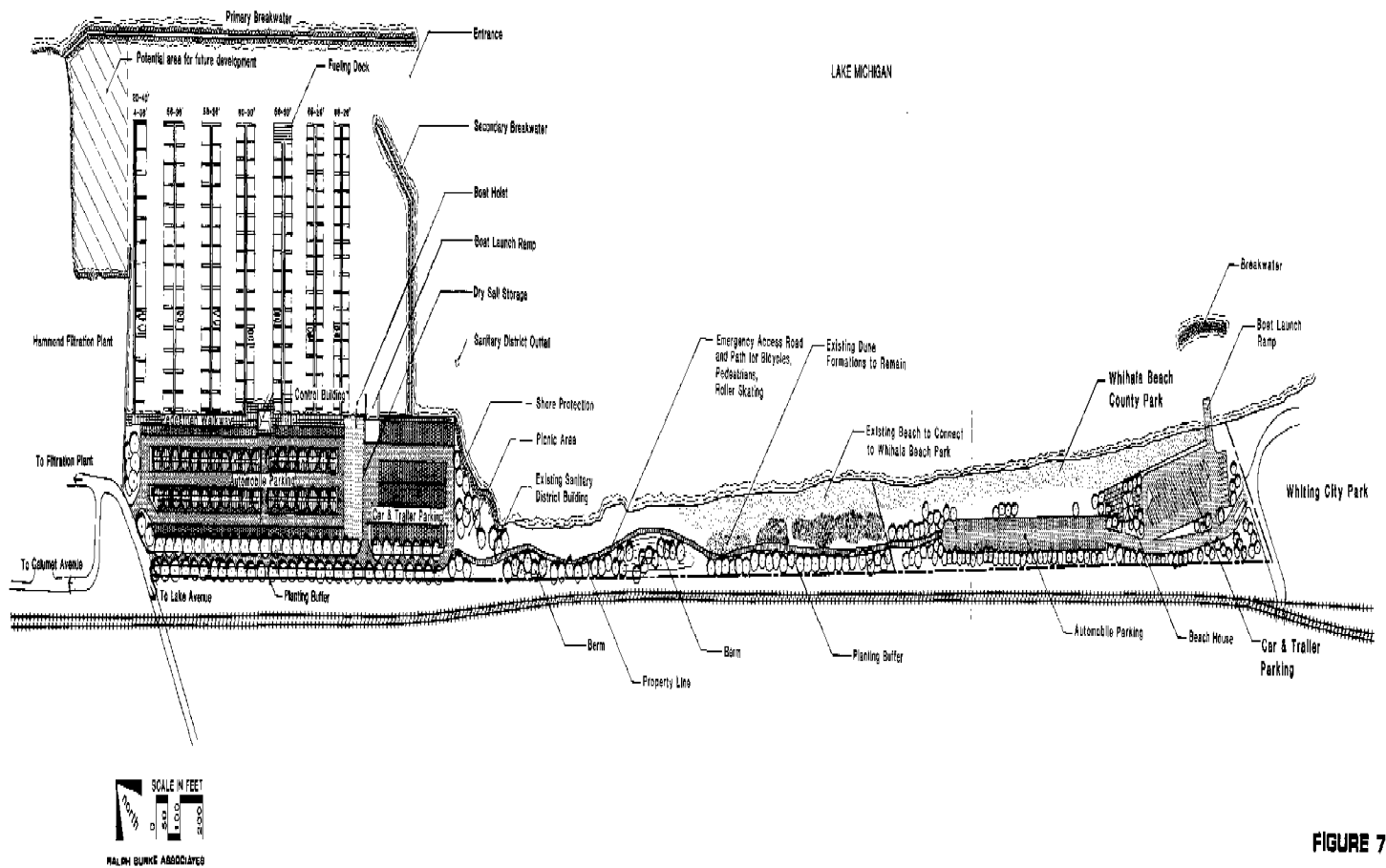


FIGURE 7

# LAKEFRONT MASTER PLAN LAKE COUNTY, INDIANA

7. COST ESTIMATE AND STAGED DEVELOPMENT PROGRAM

A. Cost Estimate for Master Plan Development

1) Marina

The project cost for the marina and boat launch facility including support facilities is estimated to be \$10,787,640 as shown by Table 12. This project cost is estimated in 1982 dollars and includes a 20 percent allowance for fees and contingencies.

Much of the project cost can be attributed to the breakwater structures needed to develop a calm harbor area suitable for storing and launching boats. The estimated cost of the two breakwaters and the dredging, at \$5,959,200, constitutes more than half the project cost. If the shoreline bulkhead structure is added to that total, about \$7,159,200 of the project cost is needed to provide the enclosing structures and water depth required for boat storage. This amounts to two-thirds of the total estimated cost. The remaining one-third, or \$3,628,440 is the estimated cost of the boat slips, launch ramp, parking, roads and other support facilities needed for the harbor. No cost has been included for property acquisition.

The boat slip cost includes utilities with an electric outlet and hose bib for each slip. Included in the slip cost are dock boxes for each slip so that boaters can store their gear. The estimate also includes a bubbler de-icing system that will prevent the area around the piling from freezing and thus eliminate the possible lifting of these piles by the combined action of ice and fluctuations in water level. Spring piles are provided between each two finger piers so that each boat in a slip is separated from the boat in the adjacent slip.

B. Shoreline Between Marina and Whihala Beach

The access road and landscaping between the proposed marina and Whihala Beach Park are estimated to cost \$102,000 in 1982 dollars as shown below by Table 13.

TABLE 13  
COST ESTIMATE FOR RECREATION  
AREA BETWEEN MARINA AND WHIHALA BEACH

1.	Site preparation		\$ 15,000
2.	Emergency Access Road		
	2,000 lineal feet x \$15/lf	=	30,000
3.	Landscaping		35,000
4.	Miscellaneous		15,000
	Subtotal		\$ 85,000
	Plus 20% fees and contingencies		17,000
	Total Estimated Cost		<u>\$102,000</u>

TABLE 12  
COST ESTIMATE FOR MARINA MASTER PLAN

ITEM	QUANTITY	UNIT COST	ESTIMATED COST	20% FEES & CONTINGENCIES	TOTAL COST
PRIMARY BREAKWATER	1450 LF.	2580 LF.	\$ 3741000	\$ 748200	\$ 4489200
SECONDARY BREAKWATER	575 LF.	1400 LF.	805000	161000	966000
BULKHEAD	1600 LF.	625 LF.	1000000	200000	1200000
DREDGING	L.S.	L.S.	420000	84000	504000
AUTOMOBILE PARKING	17000 SY.	25 SY.	425000	85000	510000
ACCESS ROAD	1350 LF.	52 LF.	70200	14040	84240
CAR & TRAILER PARKING	10000 SY.	17.5 SY.	175000	35000	210000
DRY SAIL STORAGE	L.S.	L.S.	33000	6600	39600
PEDESTRIAN WALKWAY	380 SY.	25 SY.	9500	1900	11400
CONTROL BUILDING	2500 SF.	80 SF.	200000	40000	240000
BOAT SLIPS INCLUDING POWER & WATER	388	4500 EA.	1746000	349200	2095200
FUELING DOCK	L.S.	L.S.	35000	7000	42000
UTILITIES	L.S.	L.S.	100000	20000	120000
SITE PREPARATION	L.S.	L.S.	20000	4000	24000
SHORE PROTECTION	250 LF.	100 LF.	25000	5000	30000
LANDSCAPING	L.S.	L.S.	60000	12000	72000
BOAT LAUNCH RAMP	L.S.	L.S.	125000	25000	150000
			<hr/> \$ 8989700	<hr/> \$ 1797940	<hr/> \$ 10787640

C. Staged Development and Construction Sequence

The timing of the construction for this project depends upon a variety of inter-related events, including the obtaining of financing and securing of the necessary permits and governmental agency approvals. Assuming that all those events have been successfully completed, it is estimated that construction of the complete master plan concept could be accomplished in four years as shown by Table 14.

The first year the two breakwaters, the dredging and the bulkhead and boat ramp could be completed. In the second year two-thirds of the parking lot, the control building, the fueling dock and the recreation facilities between the marina and Whihala Beach would be completed. The first phase of boat slip construction would also take place during the second year. The first piers constructed would be the three at the east end of the harbor, Piers 5, 6 and 7. This would include the fueling pier and the sanitary pumpout. Boats could also be stored at the open water to the west using moorings which are floating buoys anchored securely to the bottom. About 254 boat storage spaces would be available in this second stage of construction.

The following year Piers 3 and 4 would be built, and in the fourth and final year Piers 1 and 2 would be built and the parking expanded to its ultimate capacity.

It should be noted that before construction at the proposed project can begin, permits must be obtained from the State of Indiana, Department of Natural Resources (DNR), and from the U. S. Army Corps of Engineers. These permits are required for construction in Lake Michigan. It is anticipated that one or both agencies would require that an Environmental Impact Assessment be prepared before the permits can be granted.

TABLE 14

Staged Development and Construction Sequence1. First Year<sup>(1)</sup>

Breakwater, bulkhead, dredging and boat ramp construction

2. Second Year

Parking Lot (slips and cars with trailers) control building and fueling dock

Recreation facilities, between Whihala Beach and marina

Stage One Marina Construction -

Piers 5, 6 and 7 plus 64 moorings

Parking - 312 automobile only

119 car and trailer spaces

Boat Spaces

Slips - Pier 5 - 56

Pier 6 - 68

Pier 7 - 66

Moorings	64
Total	254

Ratio - Parking to boat storage spaces  $312 \div 254 = 1.23$ 3. Third Year

Stage Two marina construction

Piers 3 and 4

Slips - Pier 3 56

Pier 4 60

Pier 5 56

Pier 6 68

Pier 7 66

Moorings	24
Total	330

Ratio - Parking to boat storage spaces  $312 \div = 0.95$ 4. Fourth Year

Stage Three Marina construction

Expand automobile parking to full capacity - 471 spaces

Piers 1 and 2

Total slips - 386

Ratio parking to boat slips = 1.22

- (1) First year of construction after financing has been arranged and all permits and governmental agency approvals have been secured.

8. ESTIMATED REVENUE AND EXPENSES

A. Estimated Revenue

The primary source of revenue for a publicly operated marina is the slip rental income, including income derived from overnight transient boaters renting the vacant slip of a boater who is on cruise and not using his slip. Other sources of income include sales of gas and oil, locker rentals, dry sail storage, boat launch fees, livery fees from charter boat operators, and miscellaneous income from vending machines and the sale of sundry items to boaters.

The income from the slip rentals (in 1982 dollars) is estimated to be \$247,900 as shown by Table 15. Income from other sources is estimated to be \$81,075 for a total estimated income of \$328,975 after the facilities of the master plan have been completed.

B. Estimated Expenses

The annual operational and maintenance expenses for the marina are estimated to be \$139,000 as shown by Table 16. Wages and salaries account for about 60 percent of the total expenses. The expenses assume that the harbor is staffed by a full-time harbor master, a full-time maintenance person and a clerical person, in addition to summer help and evening security personnel. It is possible that some of the maintenance and clerical work can be accomplished by County Park personnel shared with other County facilities to reduce the expenses attributable to marina operations.

TABLE 15

ESTIMATED ANNUAL INCOME FOR MARINA AND BOAT LAUNCH  
FOR MARINA IN FIRST FULL YEAR OF OPERATION  
AFTER CONSTRUCTION OF COMPLETE MASTER PLAN

Estimated Income

## A. Slip Income

20 (40') x \$925	=	\$18,500
116 (36') x \$775	=	89,900
116 (30') x \$625	=	72,500
134 (26') x \$500	=	<u>67,000</u>

\$247,900

## B. Other Income

Boat Launch Ramp (See Appendix E)		\$26,500
Fuel - 120,000 gallons x \$0.20 net profit	=	\$24,000
Lockers @ \$40/year x 200 lockers	=	\$ 8,000
Dry Sail - 20 boats x \$175 per year	=	\$ 3,500

## Overnight slip rental

750 boats per season x \$12.50 average charge = \$ 9,375

## Sanitary Pumpouts

800 per season x \$4 per pumpout = \$ 3,200

## Charter Boats - livery license

20 boats x \$200 license fee = \$ 4,000

## Miscellaneous Income - soft drinks,

merchandise sold, ice, fishing licenses = \$ 2,500

## Subtotal

\$ 81,075

## Total Estimated Income

\$328,975

TABLE 16  
ESTIMATED ANNUAL EXPENSES  
FOR MARINA AND BOAT LAUNCH

1. Wages and Salaries

Harbormaster	\$ 25,000
Clerical	11,500
Maintenance	15,000
Security	<u>15,000</u>

Subtotal 66,500

Employee benefits @ 27% 18,000

Subtotal wages and salaries \$ 84,500

2. Other Expenses

Maintenance and Repair	\$ 15,000
Supplies	2,500
Insurance	12,000
Utilities	20,000
Miscellaneous	<u>5,000</u>

Subtotal \$ 54,500

Total Estimated Annual Expenses \$139,000

9. DISCUSSION OF FINANCING AND PRELIMINARY FEASIBILITY

A marina project of the scope proposed by this study is costly because the breakwaters needed to provide a safe harbor are not already in place. They must be financed and in place before the slips and boat launch area can be built.

The proposed marina master plan will generate a net annual revenue of about \$189,975 as shown below:

Estimated Revenue (1982 dollars)	\$328,975
Minus Estimated Expenses	139,000
Net Income	\$189,975

Assuming financing at 12 percent for 10 years, with a level annual debt service of \$177 per \$1,000 borrowed, about \$1,070,000 of the project cost could be amortized from annual revenues. This analysis assumes that no debt service coverage is required as would be the case for revenue bond financing. Other sources of funding would be required to complete the harbor financing.

The other major sources for capital contributions are the federal government through the Corps of Engineers, the State of Indiana and the Lake County Parks and Recreation Department. Federal funds are available through the Corps of Engineers for recreational boat harbors such as the one proposed by the master plan study. These funds are available through two programs. The first is Section 107 of the River and Harbor Act, enacted in 1960. This program provides federal assistance for small craft harbors on a 50/50 cost sharing basis with a \$2,000,000 limit of participation. A minimum of five to six years would be required for the required studies and approvals once the Corps obtained authorization to proceed. At the present time, recreational harbors have a low priority with this program.

Another way for the Corps to participate would be by direct congressional authorization for the general navigation facilities. These would include the breakwaters, navigation lights and dredging of the entrance and boat maneuver areas. The cost of the general navigation facilities would be shared on a 50/50 basis with the boat slips, launch ramps and landside development being the local responsibility. The Corps of Engineers would assume responsibility for maintenance of the breakwaters and the major access channels. The slip areas should be the responsibility of the Lake County Parks and Recreation Department.

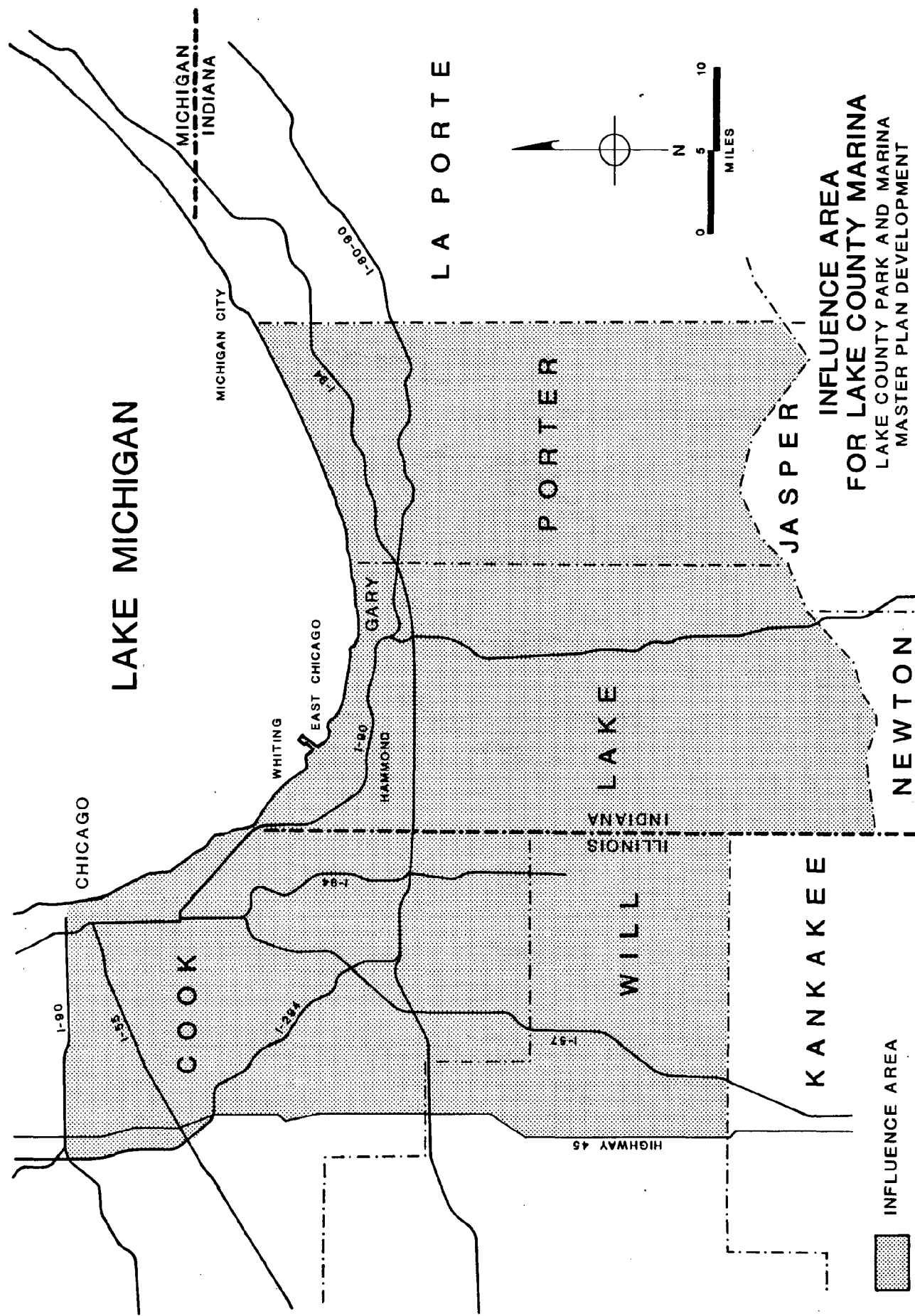
Another source of funding is the State of Indiana. At this time, the State has a Public Access Program administered through the DNR's Fish and Wildlife Department. Program funds are limited and are used to provide access to natural lakes, rivers and streams. Use of funds for Lake Michigan boating facilities is not precluded;

however, budget limitations and the unique design requirements on Lake Michigan are beyond the program's capabilities. However, the option does exist to include funds for a specific project such as a Lake Michigan boat ramp if approved by the legislature.

The Lake County Parks and Recreation Board can provide funding by issuing general obligation bonds, and this source could be used to augment other sources. The County's assessed valuation at this time is approximately \$1,875,000,000. The tax rate for the Parks and Recreation Department has been frozen at two percent (2%) of the total assessed valuation, for a total bonding capability of about \$37,500,000.

The County has a 1977 bond issue of \$3,000,000 outstanding which will be retired in 1987. A \$5,515,000 bond issue has been approved in 1982 and it too would be retired in 1987. These two issues are the only bonds outstanding, and by 1983, the total debt for the Parks and Recreation Department is estimated to be about \$8,000,000. This means that there would be almost \$30,000,000 in potential bonding capability available in 1983. The amount of bonds sold would depend upon the money that could be obtained from other sources.

APPENDICES



## APPENDIX B

### LIST OF BACKGROUND REPORTS

1. D'Appolonia, "Environmental Impact Assessment, Hammond Marina Site" prepared for Lake County Parks and Recreation Department, November, 1980.
2. D'Appolonia, "Environmental Impact Assessment, Gary Marina Site" prepared for Lake County Park and Recreation Department, November, 1980.
3. Hughes Associates, "Hammond Marina Access Study" prepared for City of Hammond, June and July, 1980.
4. Indiana Department of Natural Resources, "Public Access to the Indiana Shoreline of Lake Michigan and Selected Tributaries" prepared for Indiana State Planning Services Agency, April, 1979.
5. Johnson, Johnson and Roy, "East Chicago Lakefront Study, East Chicago, Illinois" prepared for City of East Chicago, April, 1978.
6. Ralph Burke Associates, "Lakeshore Park and Marina Master Plan Development, Lake County, Indiana" prepared for Lake County Parks and Recreation Board, March, 1976.
7. Recreation Planning Associates, "Michigan City Development Plan" prepared for State Planning Services Agency, December, 1980.
8. Stanley Consultants, "Whiting Park Shoreline and Park Development Study" prepared for Department of Parks and Recreation, City of Whiting, Indiana, July, 1980.
9. U.S. Army Corps of Engineers, "Lake Michigan Regional Boating Survey and Analysis", January, 1974.

APPENDIX C

TABLE C-1  
REGISTERED BOATS WITHIN INFLUENCE AREA BY STORAGE TYPE

REGISTERED BOATS WITHIN INFLUENCE AREA BY STORAGE TYPE						
Boat Size and/or Type	Number	Percentage(1) Using Lake Michigan	Total Estimated Boats Using Lake Michigan	Total Within Influence Area	Estimated Demand By Storage Type	
					Launch(1)	Berth(1)
<u>Lake County(2)</u>						
Inboard						
16' - 25' over 25'	576 70	0.60 0.85	346 x 100% 60 x 100%	= 346 = 60	346 x .37(1) = 128	346 x .63(1) = 218 60 x 1.0(1) = 60
Outboard						
16' - 25' over 25'	2030 29	0.60 0.85	1220 x 100% 25 x 100%	= 1220 = 25	1220 x .85(1) = 1037	1220 x .15(1) = 183 25 x 1.0(1) = 25
Inboard/Outboard						
16' - 25' over 25'	824 14	0.60 0.85	494 x 100% 12 x 100%	= 494 = 12	494 x .80(1) = 395	494 x .20(1) = 99 12 x 1.0 = 12
Sailboat						
16' - 25' over 25'	27 12	0.60 0.85	16 x 100% 10 x 100%	= 16 = 10	16 x .28(1) = 4 -	16 x .72(1) = 12 10 x 1.0(1) = 10
			TOTAL LAKE COUNTY	2183	1564	619
<u>Porter County</u>						
16' - 25' over 25'	1050 37	.65 .90	683 x 1.0 33 x 1.0	= 683 = 33	683 x .753(3) = 514 -	683 x .247(3) = 169 33 x 1.0 = 33
			TOTAL PORTER COUNTY	716	514	202
<u>Will County</u>						
16' - 25' over 25'	2932 261	.26 .35	762 x .15 91 x .15	= 114 = 32	114 x .75(4) = 86 -	114 x .25(4) = 28 32 x 1.0 = 32
			TOTAL WILL COUNTY	146	86	60
<u>Cook County</u>						
16 - 25' over 25'	23727 2010	.41 .78	9728 x .35 1568 x .35	= 3404 = 549	3404 <sup>(4)</sup> x .75 = 2554 -	3404 x .25(4) = 851 549 x 1.0 = 549
			TOTAL COOK COUNTY	3953	2554	1400

(1) Source: "Lake Michigan Regional Boating Survey", U. S. Army Corps of Engineers, 1973

(2) Source: Lake County Assessor's Office

(3) Lake County - Total Boats (16' - 25') Using Lake Michigan = 2076

Launch 1564/2076 = 75.3%

Berth 512/2076 = 24.7%

(4) Assume Launch = 75%

Berth = 25%

APPENDIX C

TABLE C-2  
ESTIMATED EXISTING AND INDUCED DEMAND FOR SLIPS WITHIN MARINA INFLUENCE AREA

Type of Demand	Lake County	Porter County	Cook County	Will County
<u>Existing Demand</u>				
Registered Boats (Table A-1)	619	202	1400	60
Coast Guard Documented Boats (Table 4)	59	25	586	41
Subtotal Existing Demand	678	227	1986	101
<u>Estimated Induced Demand(1)</u>				
Registered Boats	$619 \times 0.4 = 248$	$227 \times 0.1 = 23$	-	-
Coast Guard Documented Boats	$59 \times 1.25 = 74$	$25 \times 0.4 = 10$	-	-
Subtotal Induced Demand	322	33	1986	101
Total Demand for Slips, including estimated induced demand	1000	260	1986	101

(1) Registered and Documented Boats per 1,000 Population (See Table 5 - Work Task 1)

	Registered	Documented
Lake County	17.9	.11
Porter County	23.1	.20
LaPorte County	27.5	.29

Ratio LaPorte County Boats to Lake & Porter Counties

	Lake County	Porter County
Registered Boats	$27.5/17.9 = 1.54$	$27.5/23.1 = 1.16$
Documented Boats	$.29/.11 = 2.64$	$.29/.20 = 1.45$

To conservatively estimate induced demand: Increase Lake County registered boats by 40%; documented boats by 125%

# APPENDIX C

TABLE C-3  
ESTIMATED DEMAND FOR LAKE COUNTY SLIPS

		<u>1981</u>	<u>1990(2)</u>	<u>2000(3)</u>
Lake County	1000 x 0.5(1) =	500	610	680
Porter County	260 x 0.25(1) =	65	79	88
Cook County	1986 x 0.075(1) =	149	182	200
Will County	101 x 0.075(1) =	10	12	13
Other (@ 10% of four counties)		<u>74</u>	<u>90</u>	<u>100</u>
		798	973	1081

(1) Assumed Usage of Lake County Marina -

Lake County - 50 percent of total slip demand  
Porter County - 25 percent of total slip demand  
Cook and Will Counties - 7.5 percent of total slip demand

(2) Assume 2% growth per year - 1981 to 1990

(3) Assume 1% growth per year - 1990 to 2000

# APPENDIX C

TABLE C-4  
ESTIMATED BOATS USING LAKE COUNTY LAUNCH LANES

		<u>1981</u>	<u>1990(3)</u>	<u>2000(4)</u>
Lake County	2189(1) x 0.5(2) =	1094	1360	1517
Porter County	514 x 0.25(2)	128	159	177
Cook County	2553 x 0.075(2)	191	237	264
Will County	80 x 0.075(2)	6	8	10
Other Locations (Estimated)		<u>100</u>	<u>120</u>	<u>130</u>
		1519	1884	2098

(1) Total demand - existing plus induced  
1564 (See Table C-1) x 1.4 = 2189

(2) Assumed Usage of Lake County Marina:

Lake County - 50 percent of total launch demand  
Porter County - 25 percent of total launch demand  
Cook and Will Counties - 7.5 percent of total launch demand

(3) Assume 2% growth per year - 1981 to 1990

(4) Assume 1% growth per year - 1990 to 2000

APPENDIX C

TABLE C-5  
ESTIMATED DEMAND FOR LAKE COUNTY BOAT LAUNCH FACILITIES

A. Peak Day -

Assume one-third of estimated boats are being used on peak weekend. Each launch lane has capacity of 36 launches per day.

	1981	1990	2000
	$(1519 \times .33) \div 36 = 13.9$ lanes	$(1884 \times .33) \div 36 = 17.3$ lanes	$(2098 \times .33) \div 36 = 19.2$ lanes

B. Estimate total annual potential launches within Lake County.  
Assume 15 annual launches by each boater.

County	1981	1990(3)	2000(4)
Lake County	2189 boats(1) x 15 launches per year x 0.70(2) launches in Lake County =	22,985	31,259
Porter County	514 boats x 15 launches per year x 0.10(2) launches in Lake County =	771	1,049
Cook County	2554 boats x 15 launches per year x 0.10(2) launches in Lake County =	3,830	5,209
Will County	80 x 15 launches per year x 0.10(2) launches in Lake County =	120	163
Other Counties	100 x 15 launches per year x 0.10(2) launches in Lake County =	150	204
	<b>Total estimated launches</b>	<b>27,856</b>	<b>37,884</b>
	Estimated launch lanes @ 2500 annual launches per lane	11.1 lanes	15.1 lanes
	say 11	say 14	say 15

(1) Total demand - existing plus induced 1564 (See Table C-1) x 1.4 = 2189

(2) Source: Lake Michigan Regional Boating Survey

(3) Assumed 2% annual growth 1981-1990

(4) Assumed 1% annual growth 1990-2000

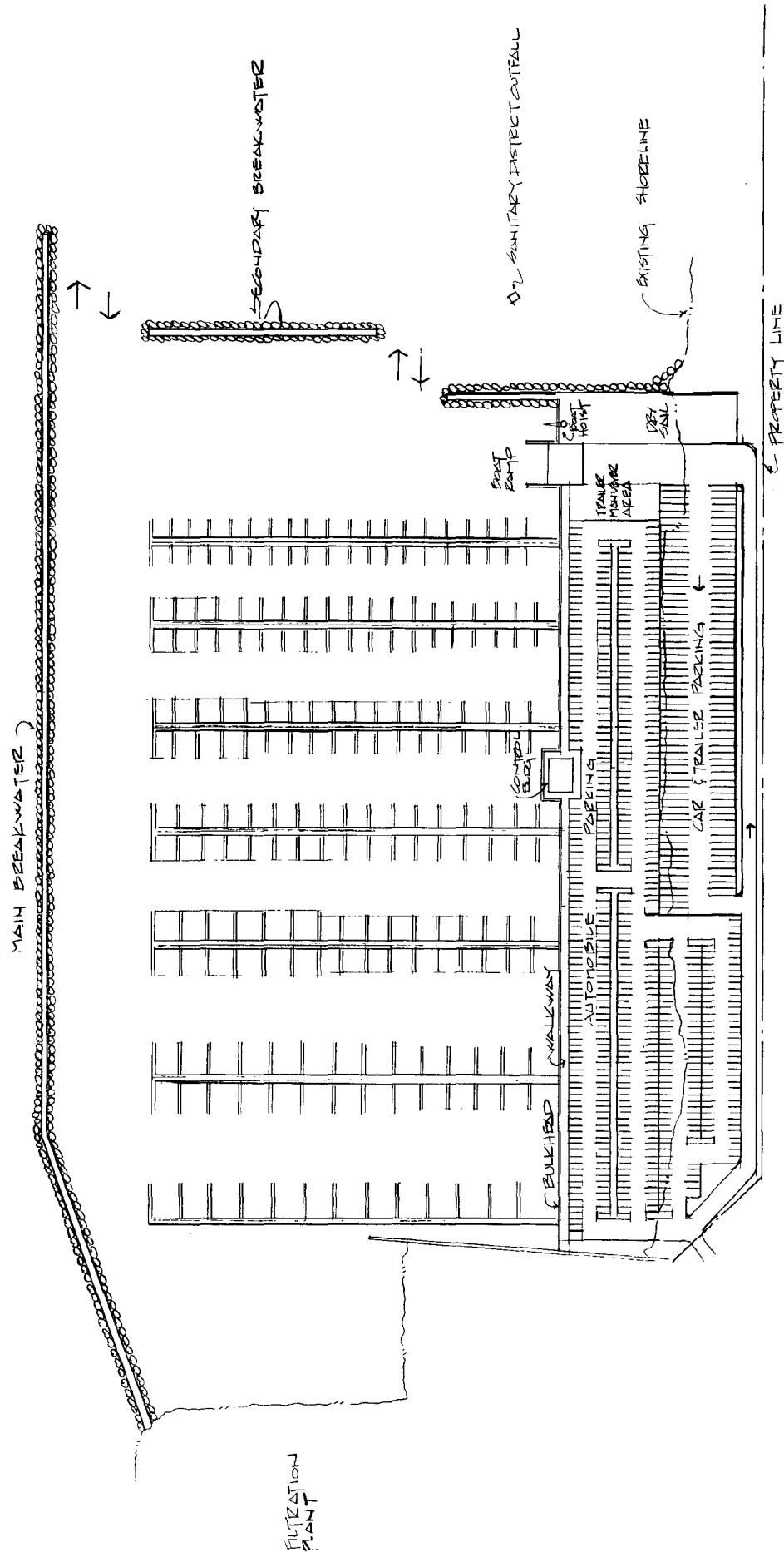
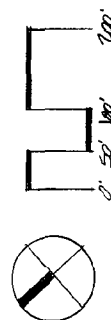


Figure D-1

# Scheme A

RALPH BURKE ASSOCIATES  
Appendix D



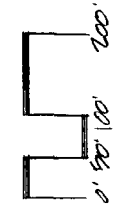
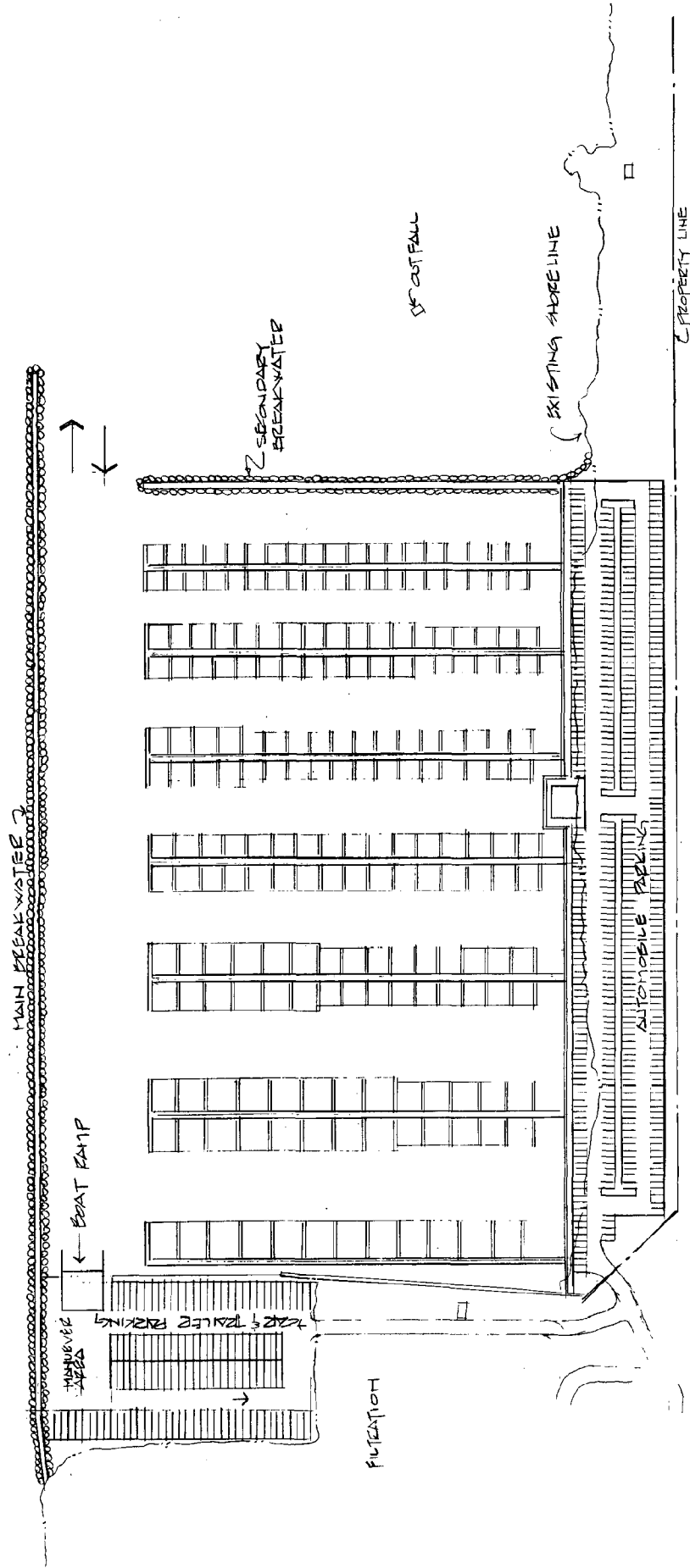


Figure D-2

# **Scheme B**

RALPH BURKE ASSOCIATES

Appendix D

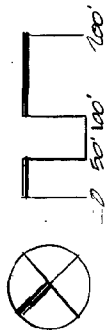
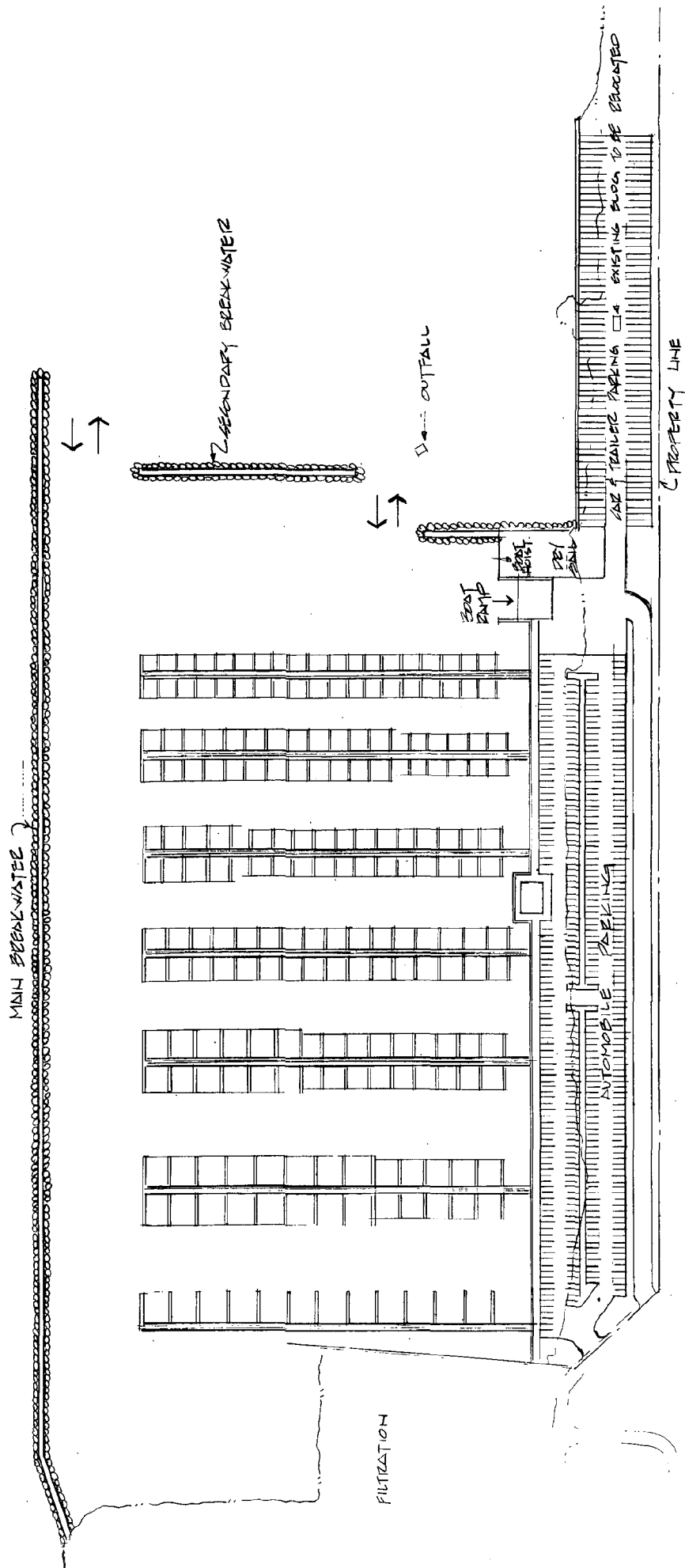


Figure D-3

# **Scheme C**

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Appendix D

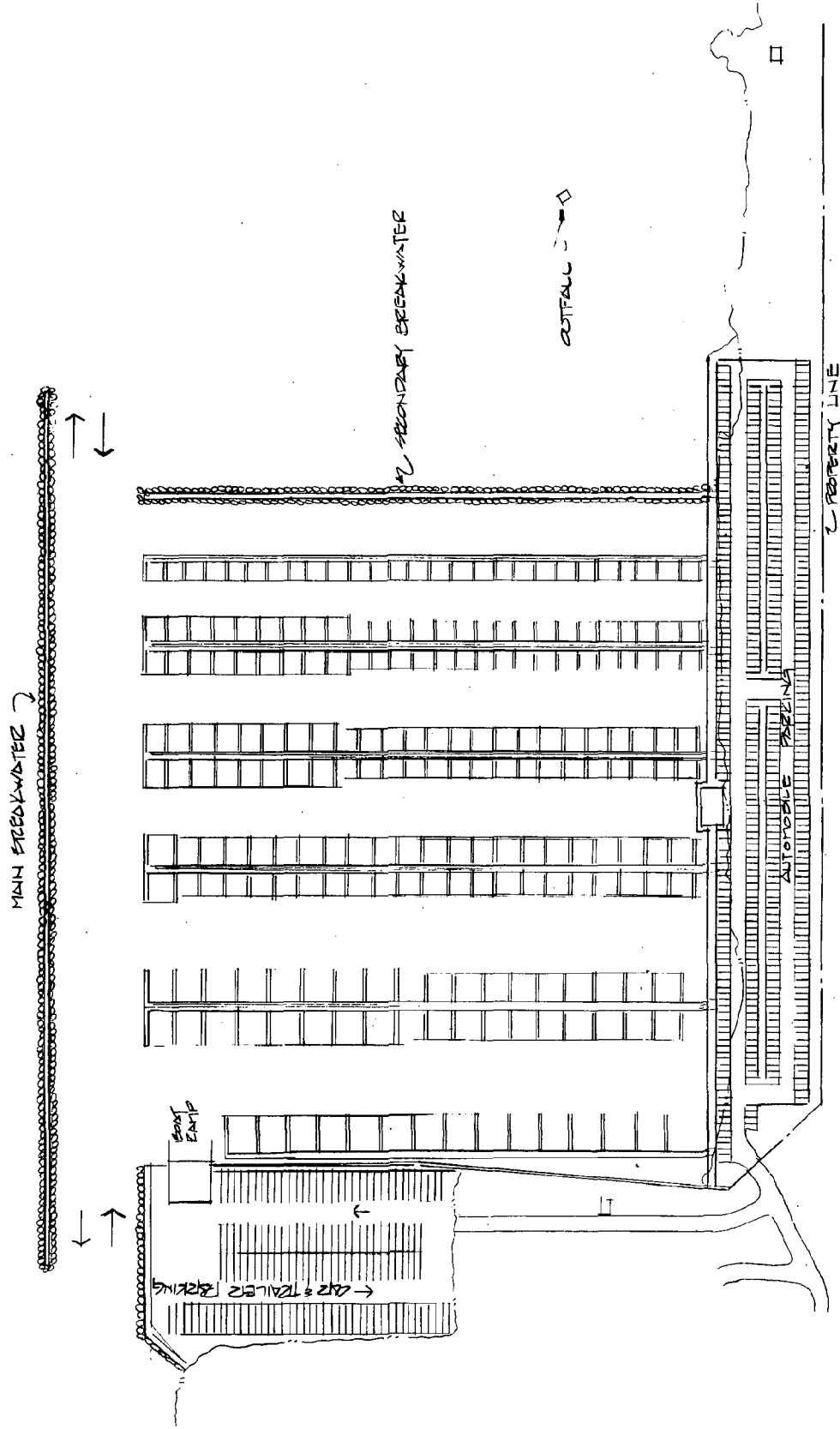
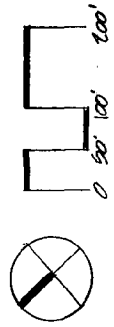


Figure D-4

## Scheme D

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Appendix D



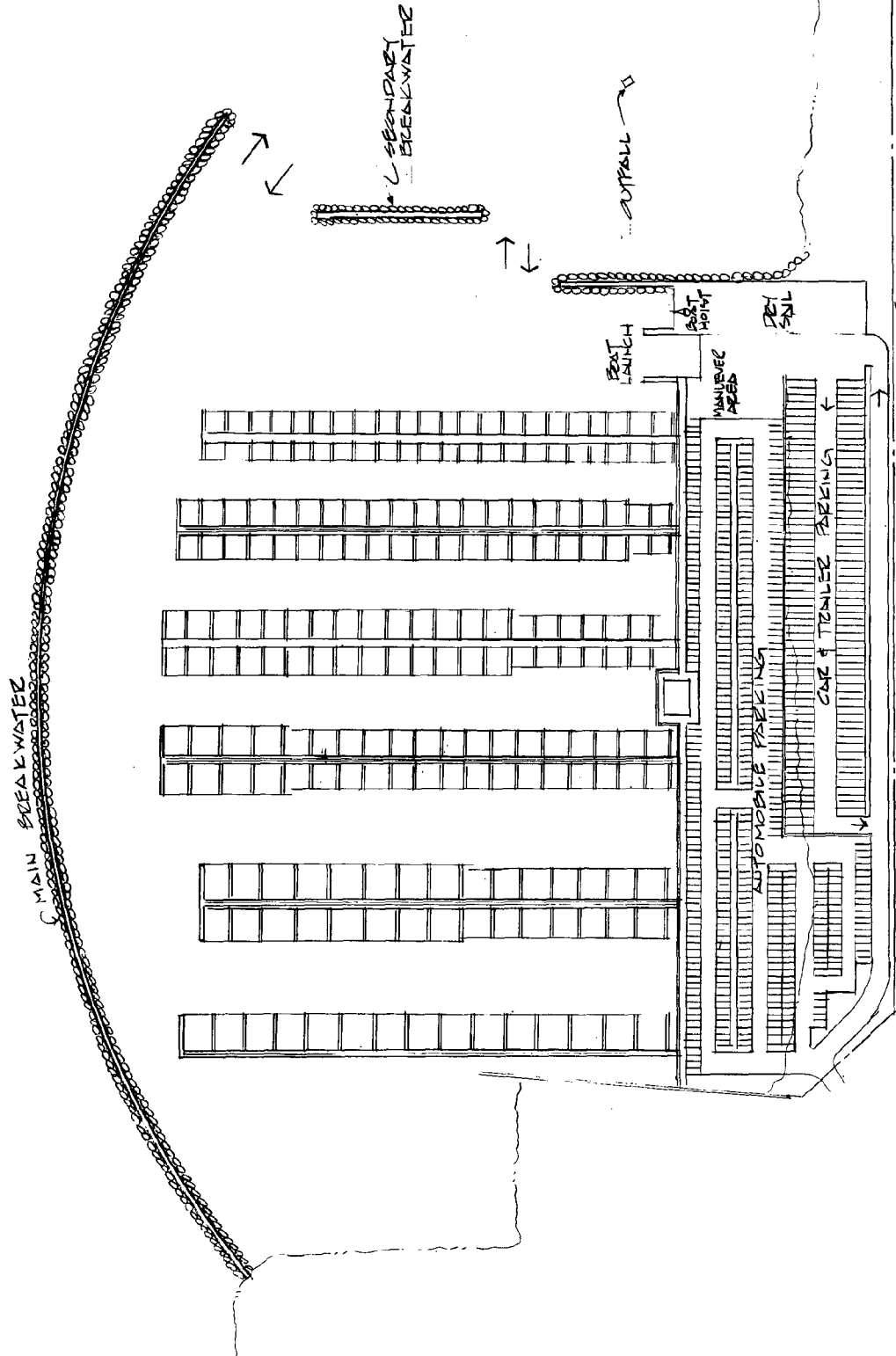
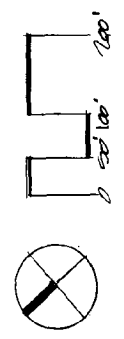


Figure D-5

**Scheme E**  
RALPH BURKE ASSOCIATES  
Appendix D



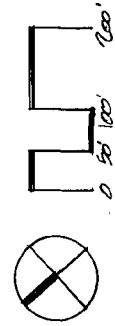
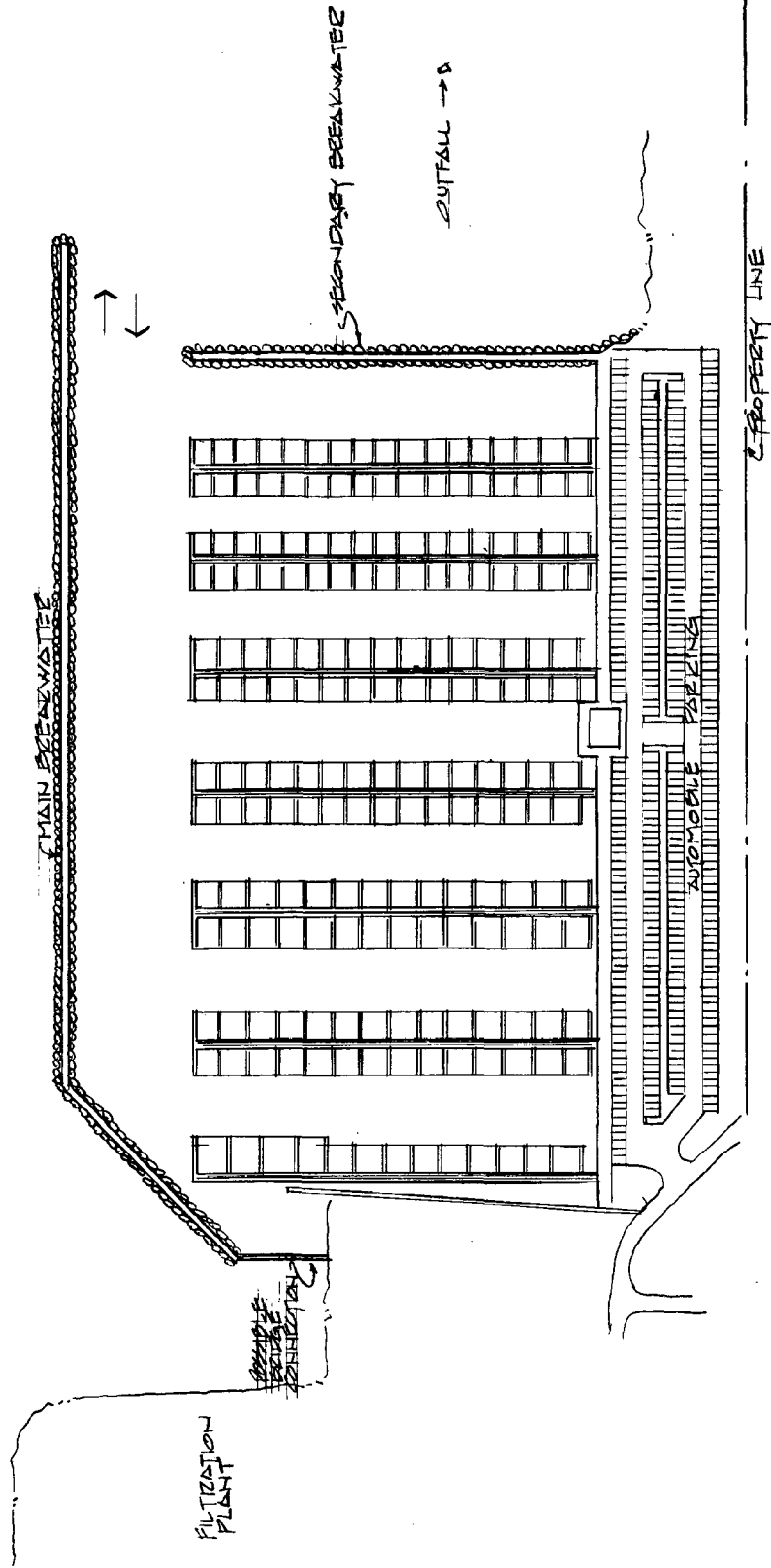


Figure D-6

# Scheme F

RALPH BURKE ASSOCIATES

Appendix D

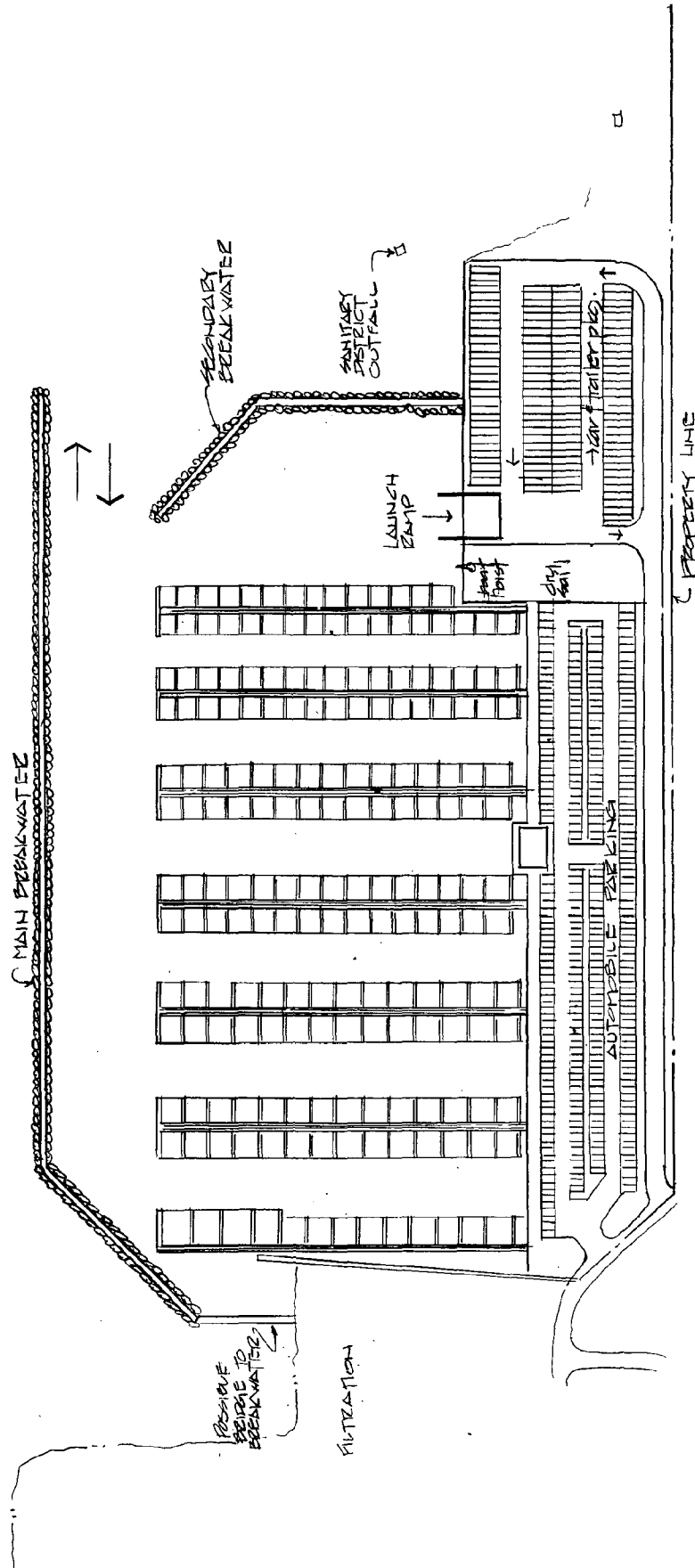
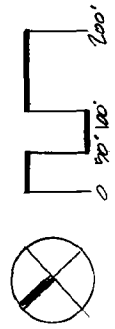


Figure D-7

# **Scheme G**

RALPH BURKE ASSOCIATES  
Appendix D



# APPENDIX D

## TABLE D-1

### COMPARISON OF SEVEN ALTERNATIVE MARINA CONCEPTS LAKE COUNTY MARINA

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>
Number of slips							
26'	100	100	100	122	96	136	128
30'	100	100	100	100	100	120	120
36'	116	116	116	116	116	134	134
40'	34	34	34	44	44	8	8
45'	32	32	32	32	32	-	-
50'	<u>24</u>	<u>24</u>	<u>24</u>	<u>28</u>	<u>30</u>	<u>-</u>	<u>-</u>
Total Slips	406	406	406	442	418	398	390
Parking spaces	568	427	407	430	435	385	360
Ratio - spaces to slips	1.40	1.05	1.00	0.97	1.04	0.97	0.92
Launch Lanes	4	0	4	4	4	0	4
Car & Trailer Parking Spaces	125	0	120	130	124	0	116
Car & Trailer Spaces per launch lanes	31	-	30	33	31	-	29
Comparative Cost(1) (See Table D-2, Appendix D)							
A	\$7,365,000						
B	\$6,530,000						
C	\$7,433,000						
D	\$7,210,000						
E	\$7,057,000						
F	\$5,161,000						
G	\$5,615,000						

(1) Only includes breakwaters, bulkhead, dredging and fill -  
Does not include slips, buildings, utilities, boat ramp or parking

APPENDIX D

TABLE D-2

COMPARATIVE COSTS  
FOR ALTERNATIVE MARINA CONCEPTS

Item	Scheme A	Scheme B	Scheme C	Scheme D	Scheme E	Scheme F	Scheme G
Main Breakwater	\$5,400,000	\$4,128,000	\$4,644,000	\$3,750,000	\$5,400,000	\$3,160,000	\$3,280,000
Secondary Breakwater	805,000	702,000	683,000	1,784,000(2)	588,000	585,000	681,000
Bulkhead	750,000	938,000	1,202,000(1)	1,000,000	813,000	656,000	1,030,000
Dredging							
On-site disposal	285,000	180,000	104,000	180,000	256,000	88,000	184,000
Off-site disposal	0	582,000	800,000	496,000	0	672,000	440,000
TOTAL	<u>\$7,240,000</u>	<u>\$6,530,000</u>	<u>\$7,433,000</u>	<u>\$7,210,000</u>	<u>\$7,057,000</u>	<u>\$5,161,000</u>	<u>\$5,615,000</u>

(1) Includes bulkhead for boat launch parking

(2) Includes north side of launch area

APPENDIX E

ESTIMATED ANNUAL BOAT LAUNCH INCOME  
FOR LAKE COUNTY MARINA

Fee structure

Daily use - Lake County resident	\$ 4.00
Non-resident	\$ 6.00
Annual Permit - Lake County resident	\$35.00
Non-resident	\$50.00

Estimated Launch Income

A. Annual Permits

Lake County Residents	180 x \$35 =	\$ 6,300
Non-resident	25 x \$50 =	\$ 1,250

B. Daily Fee

Lake County residents	1000 launches x \$4.00 =	\$ 4,000
Non-residents	2500 launches x \$6.00 =	<u>\$15,000</u>

Total Annual Income \$26,550

say \$26,500

US Department of Commerce  
NOAA Coastal Services Center Library  
2234 South Hobson Avenue  
Charleston, SC 29405-2413

